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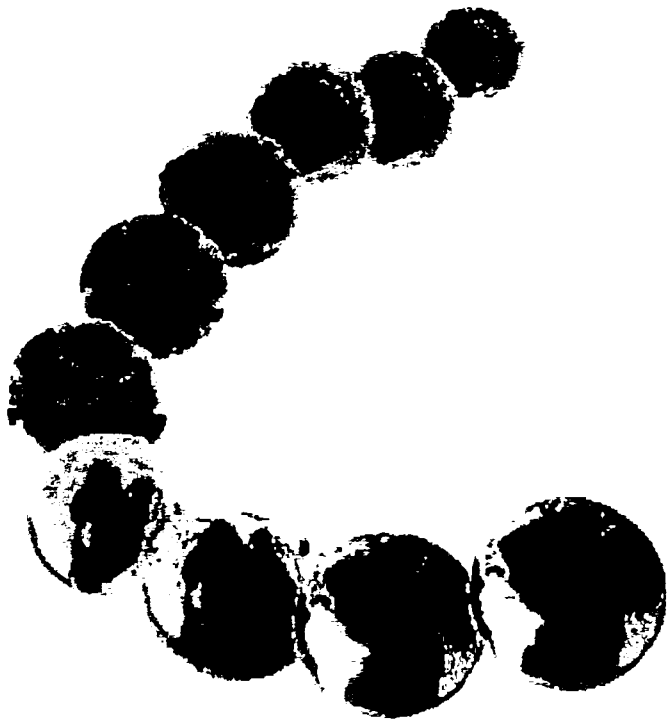
RECIPROCAL SYSTEM GEOPHYSICS



Analysis of the INNER CORE and the SCALAR EXPANSION of Planetary Bodies

RECIPROCITY STAFF

Bruce-Michael..Peret — c/o 5456 Hwy 321, Butler, Tennesee state, uSA, Non-Domestic [37640]
Editor — *bruce.peret@pobox.com*

K.V.K. Nehru — P.G. School, J.N.T. University, Hyderābād 500 028, India
Associate Editor — *kvkn@hotmail.com*

Frank H. Meyer — 1103 15th Avenue SE, Minneapolis, MN 55414
Associate Editor — *fhmisus@daeron.com*

Russell Kramer — 33 Ranch Road, Falmouth, MA 02536
Associate Editor — *syndyne@hotmail.com*

Tobey Wheelock — 5 Littlefield Lane, Boston, VA 22713
Associate Editor — *jstwew@aol.com*

THE INTERNATIONAL SOCIETY OF UNIFIED SCIENCE

Hoyt A. Stearns, Jr. — 4131 East Cannon Drive, Phoenix, AZ 85028
President — *hoyt@isus.wierius.com*

Frank H. Meyer — 1103 15th Avenue SE, Minneapolis, MN 55414
Vice President — *fhmisus@daeron.com*

Rainer F. Huck — 1680 East Atkin Avenue, Salt Lake City, UT 84106
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Lawrence E. Denslow — P.O. Box 1034, Highland City, FL 33846
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http://www.randomc.com/~rs/

Michael Wells — 2850 Delk Road, Apt 5-E, Marietta, GA 30067, U.S.A.
Webmaster — *rs@randomc.com*

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Announcing

Reciprocity Back Issues collection is now available for purchase. Check enclosed catalog for pricing.

On-line books! A number of Dewey Larson's books are now online on the *Reciprocal System* Research site, **http://www.randomc.com/~rs/**. More coming as time permits.

Discussion lists! There are two Internet mailing lists for ISUS and the Reciprocal System:

ISUS-Announce@egroups.com for general ISUS announcements
ISUS-Discuss@egroups.com for discussions and questions regarding the *Reciprocal System*.

Go to **http://www.egroups.com/** to sign up via the Web.

From the Editor

Dr. Bruce Peret

This issue of *Reciprocity* is a combination of all four issues for 1998, lumped under one cover. We have had no money in the editorial account for publishing for over a year; this issue is coming out because of the generosity of Rainer Huck, who has loaned ISUS the necessary funds for publication.

I do not have the details of what is going on with the officers of ISUS, however I have been informed that Rainer Huck has taken over as treasurer, and we are switching back to the old mailing address in Salt Lake City. This issue reflects those changes.

Back Issues

On the bright side, the *Reciprocity Back Issues* collection is complete, and available for purchase. See enclosed catalog for details.

E-Mail Lists

We have also set up a couple of e-mail lists, for the discussion of Reciprocal System theory, and general announcements. Both lists are available on the Egroups server, http://www.egroups.com/ and are called:

> **ISUS-Announce** (business, editorial announcements, few messages, moderated)
>
> **ISUS-Discuss** (general discussion on Reciprocal System theory, open to all).

Also, for those who are interested in the metaphysical side of the *Reciprocal System*, L/L Research has their "Wanderers" discussion group on the *Ra Material*, part of which concerns the application of the *Reciprocal System* to higher levels of existence. Refer to http://www.llresearch.org/ for details on list membership.

Membership Database

The current ISUS membership database *is* "Year 2000" compliant, so membership information (expiration dates, etc.) will not be lost over the year 2000 transition. (Not the "millennium", which does not occur until 2001, as there is no CE year zero).

Support for Sovereign Citizens

We have also added support for alternate name formats, and non-domestic mailing addresses within these united States of America. The default is to use your common name, and federal mailing zone (state abbreviations and ZIP codes). The name formats are (using myself as an example):

Common name:	Bruce M. Peret
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(Note that the *nom de guerre* refers to a fictitious person; not the sovereign Citizen).

Also supported is the Non-Domestic address format within these united States of America, which allows postal mail to be delivered "care of" domestic mail.

Domestic mail format (within the United States):

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(The *United States* refers to the Federal legislative democracy, having venue in the District of Columbia and all its territories and enclaves, whereas these *united States of America* refers to the Constitutional Republic whose venue is a union of 50 independent sovereign states, not including the District of Columbia, territories or enclaves.)

Please contact the editor (preferably via e-mail) if you wish to use one of the alternate name formats, or non-domestic mail.

I am not aware of any other country where this "dual government" exists; if there is, please contact the editor with information on how to structure postal addresses appropriately.

Remodelling the Big Bang

Dewey B. Larson

Unquestionably, the most significant development that has taken place in cosmology in recent years is the replacement of the original Big Bang theory by a totally different hypothesis. The drastic nature of the conceptual change that is involved is well illustrated by comparing the following two statements:

> According to this [Big Bang] theory, the outward motion of the galaxies was caused by an exploding *atome primitif* which ejected them in all directions.
>
> –H. Alfven, 1966

> Many people (including some scientists) think of the precession of the galaxies as due to the explosion of a lump of matter into a pre-existing void, with the galaxies as fragments rushing through space. This is quite wrong the expanding universe is not the motion of the galaxies *through* space, away from some centre, but is the steady expansion of space.
>
> –Paul Davies, 1981

While the new hypothesis still goes by the name of the Big Bang in most of the current literature, its conceptual basis is obviously very different from that of the original Big Bang. The objective of the change was to extricate cosmological theory from the multitude of difficulties that have been experienced in developing the original Big Bang theory in detail. To a large degree, the new hypothesis accomplishes this objective, but it does so at the expense of eliminating the explanatory content of the original theory.

The original version of the Big Bang provided an explanation of the expansion of the universe in terms of a known process, the explosion of an unstable aggregate of matter. Because of the gigantic extension of the scale of the explosive process that was required in order to apply it to the universe as a while, this explanation was never very plausible, and its repudiation by a large segment of the astronomical community is readily understandable. However, it should be understood that the hypothesis of an inflationary universe that is now being offered as a replacement for the original Big Bang contains no explanation at all.

The observed fact that calls for some kind of an explanation is that the portion of the universe within the current observational limits is expanding in the context of the conventional spatial reference system. Some attempts have been made to extend the explosion concept to the space expansion hypothesis, and we occasionally hear expressions such as explosion of space itself. But an explosion is a process of a specific nature, one in which energy in a concentrated form is suddenly converted to kinetic energy and applied to acceleration of the residual products. Inasmuch as the revised Big Bang is something of a totally different character, it is not an explosion. It is a purely hypothetical concept for which there is no known physical justification. Aside from this clearly unacceptable suggestion, the new hypothesis simply accepts the expansion as a given feature of the universe, and makes no attempt at explanation.

It is evident that we will have to look further for any real explanation of the observed situation. Now that the original explosion explanation has been discarded, we need to find some other means of accounting for the observed outward motion of the galaxies. In approaching this task, the first point that should be considered is whether we have correctly identified the problem, specifically whether the galaxies are actually moving outward in the manner described by the astronomers. The principal evidence for this expansion is the Doppler shift in the frequencies of the radiation received from the distant galaxies. It is generally conceded that this frequency shift is sufficient to establish the reality of the outward movement. There is some controversy with respect to the applicability of the usual redshift-distance relation in certain special cases, but there appears to be adequate support for the conclusion that the normal galaxies are actually receding from our location at the speeds indicated by the redshifts. However, this does not settle the issue as to whether the present interpretation of the motions of the galaxies is correct. We still have to consider the deeper question as to whether we are using the correct reference system.

It is ordinarily assumed that the stationary spatial coordinate system to which we customarily refer the motions of the galaxies is the *natural* reference system, the one to which physical activity actually conforms. On the basis of previous experience, this

appears to be a logical assumption; Indeed, it seems so obvious that the possibility that it might be erroneous has seldom, if ever, been examined. But nature does not always agree with the results of human thinking, and when we are confronted with a difficult problem we always need to explore the possibility that our assumptions with respect to the factors that enter into this problem may be invalid.

The question arises, How can we determine whether nature prefers one reference system over another? The first step toward arriving at an answer to this question is to *define* the natural reference system. This presents no problem. Once the issue is raised, it is obvious that the natural reference system is that system in which an object that is, in fact motionless, does not move. We may further say that any object which has no independent capability of motion, and is not acted upon by any external force is, if fact, motionless. By definition, such an object must remain stationary in the natural system of reference.

What we need to do, then, is to identify some physical objects of this kind and see how they behave relative to our conventional system of reference. Once class of such objects consists of the photons of light and other electromagnetic radiation. So far as we know, these photons have no capability of independent motion. No mechanism for the propagation of radiation has ever been discovered. Einstein is often credited with having provided an explanation of this phenomenon, but what he actually did was to dismiss the problem as too difficult. In *The Evolution of Physics*, he discusses the difficulties, and concludes that:

> Our only way out seems to be to take for granted the fact that space has the property of transmitting electromagnetic waves, and not to bother too much about the meaning of this statement.

By this time, after long years of effort have failed to find any trace of a motion-generating property in electromagnetic radiation, we may legitimately conclude that the photon is incapable of independent motion. In the absence of any evidence that it is, or can be, acted upon by any agency in open space, it can therefore be identified as motionless in the natural system of reference. But it is *not* motionless in the conventional reference system. In this system, photons move outward from their points of origin at the speed of light, if not subjected to external forces. Neutrinos and other massless particles follow the same pattern. Furthermore, the same is true of the galaxies at extreme distance. The matter of which these galaxies are composed does have a property, gravitation, which is capable of causing motion to take place, but this is the only such property that it possesses, so far as we are able to determine, and when the gravitational effect has been reduced to a negligible level by extreme distance, the galaxies, too, move outward at the speed of light.

If only one such class of objects was involved, we would have to consider the possibility that the objects of this class might contain a concealed motion-producing mechanism. But since three different classes of objects follow the same pattern, this possibility can be ruled out on probability grounds. We must therefore conclude that the objects of these three classes are, in fact, *not* moving; that is, they are motionless relative to the natural reference system. The reason why they have no mechanism for causing motion (or effective motion, in the case of the distant galaxies) is then evident. Objects that do not move have no need for a motion-producing mechanism.

Each of these motionless objects that is represented in the conventional system of reference as moving outward at the speed of light is observed to be moving in a definite direction in that reference system. It can be shown, however, that this direction is a result of the manner in which the motion is coupled to the reference system, and is not an inherent property of the motion itself. For this purpose, let us review what we know about the motions of the galaxies. Since all of the distant galaxies are moving outward away from us, it follows that, unless our galaxy is the only stationary object in the universe, a hypothesis that no scientist accepts today, we must be moving outward away from all other galaxies. Consequently, we are moving outward in *all* directions. This means that our motion has no specific direction. Inasmuch as there is no reason to believe that our galaxy is unique in this respect, we can conclude that this is a general property of the galaxies, and that all galaxies (except those that are quite close, and are therefore subject to relatively strong gravitational forces) are moving outward without any specific direction. Such motion, which as magnitude only, and no inherent direction, is *scalar motion*.

The existence of scalar motion is not recognized by conventional science. In fact, motion is customarily defined in vectorial terms. But the motions of the galaxies, as we observe them, are definitely scalar, and the information now available regarding the motions of the photons and massless particles indicates that these are motions of the same kind. For present purposes it is important to recognize that scalar motions cannot be represented in their true

character in the conventional reference system. This limitation of the capability of the reference system is new to science, and some may find it hard to accept, but its existence can easily be verified by a further examination of the galactic situation.

We can represent the motions of the distant galaxies in the usual manner, as radially outward from our location, only if we assume (1) that our galaxy is motionless, and (2) that each of the other galaxies has a specific direction of movement. But we know that both of these assumptions are false. Aside from the exception stated, all galaxies, including ours, are moving outward in all directions. It follows that the representation of the motion of any galaxy in the conventional reference system can only show the change of position relative to some *one* location in that system of reference. We take our galaxy as the reference location, and we see galaxy X as moving in the direction AX, where A represents our location. But observers in galaxy B see galaxy X as moving in a totally different direction BX, those in galaxy C see it moving in the direction CX, and so on.

We may generalize the relation between scalar motion and the conventional reference system by saying that scalar motion can be represented in this reference system only by the use of a reference point, a point in the moving system that is coupled to the stationary reference system by arbitrarily assuming that it is motionless (from the scalar standpoint) in that system of reference. As has been indicated, the usual reference point for the motion of the galaxies is the position of our own Milky Way galaxy. For the photons and the massless particles, the reference point is the point of origin, and the direction taken by each individual particle is determined by chance.

All of the objects that we have identified as motionless in the natural reference system are observed in the conventional system of reference as moving outward from their respective reference points in the same manner and at the same speed, the speed of light. It follows that this is the relative motion of the two systems; that is, the natural system of reference is moving outward at the speed of light relative to the conventional system.

This outward movement of the natural reference system carries *all* physical entities with it, the consequence being that objects which are motionless in the *conventional* reference system are, in fact, moving *inward* at the speed of light. This finding revolutionizes the problem of identifying the motion mechanisms. Instead of having to look for one mechanism whereby electromagnetic radiation is propagated, another to account for the motion of massless particles, and still another to explain the recession of the most distant galaxies, all that we need to do is to identify a mechanism whereby the atoms and particles of matter are able to move inward toward each other. This is easily done. It is true that the *nature* of this mechanism whereby matter is capable of self-generated motion has never been identified by previous investigators, but the *existence* of such a mechanism is incontestable. This mechanism is gravitation, a known property of matter that accomplishes exactly what is required in order to counterbalance all or part of the effect of the outward progression of the natural reference system. It moves each gravitating object toward all others.

From the fact that the gravitational motion is the inverse of the outward motion, or progression, of the natural reference system, it can be recognized as an *inward scalar motion*. It is generally regarded as a force, but there is no conflict here, as force is defined in such a way (by Newton s Second Law of Motion) that it is a property of a motion. Einstein s "principle of equivalence," the key feature of his General Theory of Relativity, asserts that gravitation is equivalent to a motion. On the basis of the findings that have been described herein, we can go a step farther and say that it is not only equivalent to a motion; it *is* a motion. But it is not vectorial motion, the only kind of motion that Einstein appears to have recognized. Identification of gravitation as an inward scalar motion accounts for the observed radial character of the gravitational force field, and eliminates the need for postulating a distortion of space by the presence of matter, one of the most questionable expedients employed in the construction of the General Theory.

Because it is generated by a fixed relation between the two reference systems, the outward movement of physical objects due to the progression of the natural system always has the same magnitude: the speed of light. But the gravitational effect varies with the distance between the objects, the interaction of these two opposing scalar motions under different conditions is therefore capable of explaining a wide variety of results within the conventional reference systems, all the way from net speeds that approach the speed of light in the outward direction to net speeds that approach the speed of light in the inward direction. In particular, the range of speeds involved in the galactic recession, the specific subject of the present inquiry, is fully explained by the combination of the two oppositely direction scalar motions. At great distances, the gravitational

attraction is weak, and the outward motion, observable as the galactic recession, predominates. As the distance decreases, the gravitational force becomes stronger, and the net outward motion decreases, until at a certain point, the gravitational limit, we may call it, the inward and outward motions are equal, and the net motion is zero. Inside this limit there is a net gravitational (inward) motion.

Here, then, we have arrived at an explanation of what is currently regarded as the primary cosmological problem, that apparent expansion of the universe, and we have reached it purely on the basis of existing knowledge, without introducing anything new or making any special assumptions. Like Copernicus in his day, all that we have found necessary is to look at our problem from a different point of view, to use a reference system that gives us a more complete and correct picture of the factors that are involved. The universe, we find, is not expanding. On the contrary, the general direction of movement is inward. The aggregates of matter, the galaxies, are *growing*. The cannibalism that is currently being attributed to the giant galaxies in the centers of relatively dense clusters is not peculiar to the giants; it is a general feature of the universe that applies to aggregates of all sizes.

Scalar Motion versus Æther Velocity

Two Views of the Same Phenomenon?

Dr. Bruce M. Peret

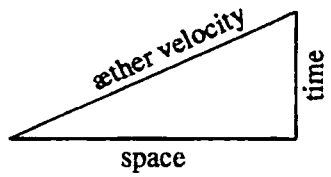
Many researchers have formed a view of the universe based on what is called æther theory. The basic premise of the theory is that there is an all-pervasive æther, a fluid-like "substance" providing the medium of E-M propagation. Having reviewed several of the æther theories, I find a number of common premises:

- Æther motion is expressed a single, scalar velocity.
- Æther forms "threads" (and thus has direction, though it may constantly change).
- Motion is *continuous*—it does not proceed in discrete units.
- The theories deal with "space" only, as does conventional physical theory.
- Infinities are present.
- *Time* is still undefined, and sometimes considered a "4th dimension."

Larson's concept of *motion* is, in many ways, similar to the concept of æther, both being *velocity*. The primary difference is that Larson's "motion" retains *both aspects* of space and time, whereas æther tends to be the value of the ratio. Since motion is defined as a displacement from the natural datum of 1.0 (unity), it is possible to have a displacement of zero in either the space or time aspect of velocity. Not a problem for the *Reciprocal System*, as motion is represented by *two* numbers—the spatial displacement and the temporal displacement.

However, since æther divides the two aspects to produce a single number, a zero temporal displacement will result in an infinity (s/0). Since all measurements are made using space as a "setting," æther theories tend to have an infinite velocity, instead of a unit velocity (speed of light), as their natural datum, and hence can explain phenomenon such as the EPR paradox by using "infinite velocity."

What it amounts to is this:



with *the Reciprocal System* tracking both the spatial and temporal axes, whereas æther theory deals with the ratio of space/time displacements.

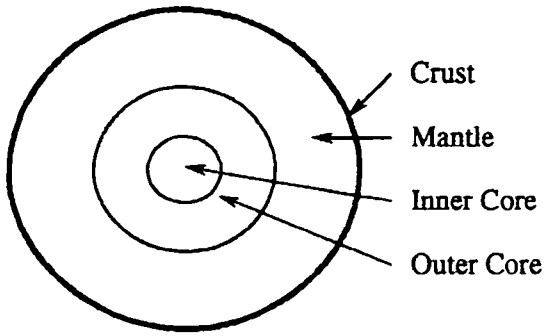
Either system is an accurate representation of the universe, given its premises. The problems arise when one system attempts to use the precepts of the other to interpret data. Both views have specific advantages and disadvantages, and the best approach is the ability to translate *between* the systems, *retaining* the original precepts.

At the Earth's Core

The Geophysics of Planetary Evolution

Dr. Bruce M. Peret

Very little is actually known about the Earth's interior. Actual research is limited to what is pulled up from a scant few miles of the crust, by deep mines and drilling rigs. Volcanoes provide some additional insight as to the existence of a molten plastic-like layer between the crust and mantle known as the asthenosphere. However, the bulk of data beyond this point comes from the distant echos of earthquakes, and the seismographic machines that plot their deviations as they traverse the depths of the Earth's interior.



What seismology has discovered is that the Earth's interior is composed of several layers of varying density and composition. The topmost being the crust, a 40-mile-thick layer of silicon, aluminum, and magnesium, cracked into large, "tectonic plates", sitting on an 1800-mile thick layer of basalt known as the mantle, covering an 1200-mile thick, irregular sphere of molten iron comprising the outer core, and finally, a solid sphere some 1600 miles in diameter, of which very little is known—the inner core.

What goes on in the depths of the Earth is still a mystery. The farther down, the bigger the mystery. According to author Dougal Dixon, "The rules of conventional physics just do not apply to the Earth's core."[1]

There are also several planetary oddities that have stumped modern science. The drifting of the magnetic poles, their inexplicable reversal of magnetic polarity, the Van Allen belts of radiation, volcanic and earthquake activity, artic areas with tropical fossils... the list goes on and on.

Perhaps the biggest mystery is the magnetic pole. "Like a magnet, the Earth has two magnetic poles. From time to time, the magnetic poles reverse polarity. ...No one knows why this happens."[2]

Until now.

Background

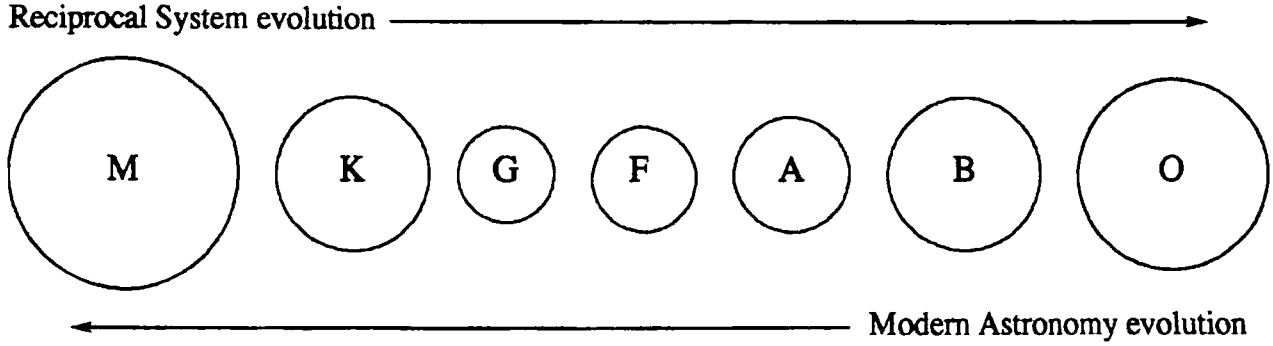
Prior to examining the geophysics of planets, it is necessary to determine how planets were formed. This will reveal the processes involved in planetary phenomena, by identifing the components that generate them.

Geophysics can be considered an intersection between physics and astronomy—the boundary between physical processes of atoms and chemistry, and the stellar ones—otherwise known as, "the planet." The *Reciprocal System* of Dewey B. Larson covers a great deal of ground in both areas; yet the Reciprocal System, itself, has never before delved into the construct of worlds; only a brief summary of their formation[3], and the physical processes that occur at the atomic level.[4]

This paper is a summary of a preliminary investigation into the natural consequences of the Reciprocal System, applied to the study of geophysics. Here, I will propose a model of solar system formation, and the evolution of planets and biospheres, as a natural result of Larson's "backwards" stellar evolutionary sequence (as compared to modern astronomical theory). From this planetary model, all of the observed Earthly phenomenon follow as logical consequence: plate tectonics, "drifting" continents, weather systems, the shifting of the poles, magnetic reversals, global cataclysms,... even the whereabouts of the mythical lost continents of Atlantis, Mu and Lemuria, and what lies ahead in the next evolutionary stage.

Stellar Evolution

Modern astronomy differs from Reciprocal Astronomy in one major aspect: the stellar combustion process. An important aspect, for it is the combustion process that determines the stellar evolutionary sequence.



Modern astronomy relies on the fusion of hydrogen to helium, the process observed within the photosphere (the outer layers of a star). This process starts out with a bang—a novæ—which forms a blue giant star, that gradually cools down, moves down the Main Sequence, and burns out (due to lack of hydrogen fuel). At the end of its life cycle, a number of strange things occur, such as its sudden bloating up to a red giant, then re-condensing down to a white dwarf, or altogether vanishing from the universe in a "black hole."

Reciprocal System astronomy is a bit more straightforward, akin to heating up a piece of metal. The only thing required to build a star is "matter" and gravitation does the rest.

Stars in the Reciprocal System, start out as large clouds of dust, emitting infra-red light from the sparse collisions of atoms. The gas and dust are pulled together by gravitation, and collisions become more frequent, heating the aggregate up so it glows dull red—a red supergiant. As more matter is pulled in, the gravitational pull of the star increases, reducing its size and increasing its temperature, moving down thru orange giant stars, and on to the Main Sequence. From this point, the stellar matter can no longer be compressed, so the star becomes physically larger, and moves up the Main Sequence towards the blue giant—exactly the opposite evolutionary path as modern astronomy.

The most important aspect of the stellar evolutionary system that we are considering is the death of a star—the supernovæ. In the Reciprocal System, it comes in two varieties, both of which are observed by modern astronomers. The first occurs when the star reaches its *thermal limit*, and explodes as a "Type I" supernovæ. This *only happens* to the blue giant O-class stars, for only they are hot enough to reach the thermal limit.

The second stellar death can happen to any class star—the *age limit*. When the matter composing the star reaches a certain age (determined by isotopic mass), it explodes. When a large enough chunk of matter does this at the same time, a "Type II" supernovæ forms. The Type II supernovæ is more violent than the Type I, and typically propels matter into the ultra-high speed range (designated 3-x), moving far in excess of the speed of light.

The supernovæ explosion throws the outer layers of the sun off into space, comprised mostly of gases and light elements. The explosion also forces an *implosion* of the heavy elements in the core. (A spatial "implosion" in the Reciprocal system is a *temporal explosion*—the imploding matter *expands in time*, and *contracts in space*.)

As mentioned, stars are created from simple aggregates of dust and rock in space, so the obvious result of a supernovæ is a large cloud of expanding matter, which will eventually slow, stop, and re-condense to form another star at the center of gravity of the debris field, usually quite near where the original supernovæ occured.

The second supernovæ byproduct—the imploded stellar core—forms a white dwarf star, with all of its unusual characteristics: inverse density gradient, intense magnetic field, quantized emission, and all the phenomenon associated with intermediate-speed (2-x) motion.[5]

The supernovæ can be considered a "birthing process" of either a binary star system (red giant/white dwarf pair), or a single star with a planetary system, depending on its generation. (A "generation" being the number of times a star has been thru the supernovæ/reformed star phase.)

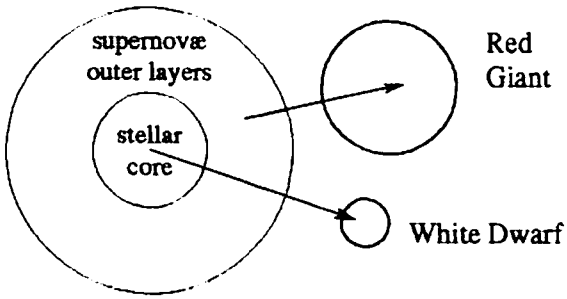
Solar System Formation

In *The Universe of Motion*, Larson proposes that the solar system was formed by a Type II supernovæ,

where there was insufficient "Substance B" (stellar core) to form a white dwarf, so the cool remains were distributed out across space in a linear form. This is one possible explanation, though it is difficult to accept that the imploding core of a star would suddenly decide to move linearly outward in space, and break into fragments. I offer an alternate explanation.

First generation stars, as those found in *young* aggregates such as globular clusters and dwarf galaxies, will *not* have any planetary systems, because their gravitation would simply pull in any nearby matter that would be the prospective planets. Even if a large rock were able to establish orbital velocity, it would decay fairly rapidly, because both the rock, and the sun, would be increasing in mass and gravitational attraction. The orbit would quickly degenerate to an ellipse, then the rock would be pulled into the sun, adding to its mass.

These first generation stars lead a solitary existence. Since they are composed of primarily "young" matter, they are most likely to continue to build mass, move up the main sequence, reach the thermal limit in the B and O-Class range, and become a Type I supernovæ. We see evidence of this in numerous open clusters (a globular cluster that has been pulled into the disk of the galaxy, and broken up), such as the Pleiades, that contain mostly blue stars, which are *about to become supernovæ*, and *enter* the binary and planet forming stages.



After the first generation star becomes a Type I supernovæ, the common binary star system is formed. Initially, neither component is visible. The original debris cloud is widely disbursed, and does not generate enough heat or light to detect, unless illuminated by nearby stars. The stellar core, *imploded in space* (and hence exploded in time), is too *hot* to observe, for its radiative emissions have moved into the X-ray band, well outside of the visible light and infrared.

From this point, gravitation takes over, and begins to condense the debris cloud, heating it up and creating a red supergiant (which we will refer to as the "A component"). Conversely, temporal gravitation takes effect on the stellar core remnant, pulling its components together in time, and expanding it in space, causing it to cool. Its emissions then move into the visible spectrum, forming the visible white dwarf star (which we will refer to as the "B component"). At this point, we have a red giant/white dwarf binary system—the second generation, and one of the most common star systems observed in this region of the galaxy. And the "parents" of an upcoming solar system.

However, the process of "giving birth" to a planetary system requires the death of the parents—another supernovæ. Examining the characteristics of the candidates, we find that it is more likely that the A component will reach its age limit and become a Type II supernovæ, before the B component can reach either the thermal or age limit.

The matter in the debris field that forms the A component will have been exposed to neutrinos, so the isotopic mass of the elements will be high. Though the B component was also exposed, its temporal motion, and inverse thermal motion, will cause isotopic mass to drop, thus making the matter "younger". By the time the A component forms a stellar object, the star will be prime for an age-limit explosion, just waiting on sufficient core density and magnetic ionization.[6]

So, by the time the A component reaches the orange giant (M or K stellar class), there is a high probability that it will become a Type II supernovæ.

The A component explodes, in a much more violent fashion than its predecessor, reaching into the ultra-high (3-x) speed ranges. Because of the proximity of the B component, the supernovæ will accelerate the white dwarf into the ultra-high speed range of the *pulsar*, and also shattering it into a number of pieces, from explosive shock wave.

This white dwarf fragments will behave like mini-pulsars, with the same "anti-gravity" motion, moving outward away from the center of mass of the system—which is the center of the supernovæ debris field; the former location of the A component star.

Thus, the second generation binary star system is destroyed, and the third, planet-bearing generation begins to form. The core of the Type II supernovæ, being in the ultra-high speed range, will be a small pulsar. However, because of the lack of heavy materials at the core, it will be a very small object, and rapidly disappear from the Material Sector, to

add to the background radiation of the Cosmic sector. Its vanishing point will, for some time, leave its mark as one focii of the elliptical orbits of the later planets.

Two other by-products of the Type II supernovæ are a ring structure, composed of intermediate (2-x) and ultra-high speed (3-x) matter, and a large cloud of low-speed (1-x) debris. The low-speed debris will eventually recondense to another red giant sun, forming the third generation star.

The matter forming ring structure will eventually cool, lose its ultra-high speed motion, and drift back towards the center of gravity (the newly forming sun). Gravitational attraction within the ring itself will create larger aggregates of matter within the ring, forming an asteroid belt. The white dwarf fragments, subject to the same conditions as the ring matter, will take up position on either side of this asteroid belt, depending on the velocity they achieved during the supernovæ explosion. Being of intermediate and ultra-high speed motion, the position of the asteroid belt, and planets, will form a quantized relationship—identified as the Titus-Bode Law. (A complete description of the *Reciprocal System* interpretation of the Titus-Bode Law can be found in *The Universe of Motion*, page 92.)

The Planets

The remnants of the white dwarf companion, shattered into pieces and distributed in a narrow conic section outwards into space, will take up orbital positions around the newly formed giant star. Unlike low-speed matter which will simply be sucked into the gravitational whirlpool of the star, the white dwarf fragments will maintain broad, slightly elliptical orbits, using the new giant sun as one focii, and the vanished core of the supernovæ as the other. The orbit is maintained because the white dwarf fragment possesses ultra-high speed motion, and like a true pulsar, will generate a motion in the same direction as the progression of the natural reference system—away from all gravitational sources. So, with gravity pulling in, and ultra-high speed motion pushing away, the planets enjoy a very stable, nearly circular orbit.

After the dust of the 2nd supernovæ has settled, we find a red giant star, condensing and heating up, moving towards the main sequence, surrounded by a a ring of rock, and typically 8 large fragments of the former white dwarf, in the sequence 4 small fragments, asteroid ring, 4 large fragments, and finally the rock, dust, and bits and pieces that were expelled far out from the original supernovæ, of both A and B component matter (low and intermediate-speed range, as not all the "heavy" matter had settled into the core when the supernovæ explosion occured).

The solar system will contain two general regions of planetary formation, on opposite sides of the asteroid belt. The larger fragments, having a more ultra-high speed motion (and thus a larger "outward" or anti-gravity movement), will be further out, past the asteroid belt, and will be called the "outer planets". The smaller fragments that exist between the sun and the asteroid belt will be designated as the "inner planets".

In the early stages of cooling, the outward motion of the white dwarf fragments will prevent any large amount of dust and debris from accreting on their surfaces. The cooling of the fragment itself, will, however, produce hydrogen and helium gases in its core which, like its stellar counterpart, will occasionally "novæ," and expel these gases and other matter onto its surface, producing a bright, combustive flare. As cooling continues, heavier elements will be produced, as more matter drops into the low speed range, and this matter will allow meteors, dust, and debris to begin to accumulate on the surface of the fragment.

The Inner Planets

The smaller fragments forming the inner planets will allow them to cool faster than the outer planets, and build a gravitational field more rapidly. As a result, they will have a chance to capture more debris from the supernovæ cloud than the outer planets will. Due to the close proximity to the sun, there will also be more of the heavier elements present, because the lightest elements get thrown the furthest out during an explosion. Once a blanket of debris surrounds the white dwarf fragment, the cooling process slows—for the layers of rock acts as insulation.

Given a typical 4-inner-planet system, what we find is the innermost planet, Planet 1, will remain mostly "white dwarf", as being exposed to the heat of the sun will slow the cooling process. Its surface will be composed of the heavy metals (remembering that the white dwarf has an *inverse* density gradient, and the highest density is on the surface), in a near molten state. Meteroic dust will add a very small quantity to this, as the proximity to the sun will also pull most debris past this small world.

Planets #2 and #3 will cool at a similar rate, and collect a reasonable amount of debris from meteor aggregation. They will be similar in size (based on

their fragment size), and collect a reasonable amount of dust and rock on their surfaces. Planet #2 will have a smaller core, but more mantle than Planet #3.

Planet #4, however, being near to the neutral point of the asteroid belt, will pick up some debris, but not nearly as much. It will cool faster than the other three, and will be the first planet of a system capable of harboring life, as the sun will still be in the giant phase, and providing sufficient heat and light for a reasonable, life-bearing environment.

Thus, the size distribution of the inner planets will be: small, medium, medium, small, with planet #4 developing life first, followed by #3, then #2 as the sun moves into the main sequence. Planet #1 will never form the water-based ecosystems that the three other planets will, as the sun will start to get hotter and larger (moving up the main sequence) before the surfaces of these planets cool sufficiently to retain water in liquid form. This, however, does not preclude the possibility of life based on other ecosystems.

As the sun grows in size and temperature, the inner planets slowly become uninhabitable, succumbing to solar heat, radiation, and charged particles, vaporizing their seas, and creating dry, arid climates.

In our system, Planets #1 thru #4 are Mercury, Venus, Earth and Mars. Mars will be the first world to develop water-based life, followed by the Earth, then Venus. By the time Venus moves into the habitable range, Mars will have moved out of it, and Earth will be in its early habitable stage. Each planet's evolution is unique—Venus has one, short life stage, Earth has one long one, and Mars has two different stages, early and late.

The Outer Planets

The larger fragment sizes of the outer planets will put them in a relatively simple inverse distribution pattern—the largest fragment will be nearest the asteroid belt, and the smallest the furthest out.

If we continue our numbering system, again with a 4-planet spread going from #5 near the asteroid belt, to #8 at the outer limits of the solar system, we can determine some of the basic geophysics.

Most of the heavy elements will not have made it past the asteroid belt layer, so the bulk of material available to the outer planets will be the lighter materials, particularly hydrogen, helium, lithium, berylium, boron, carbon, nitrogen, oxygen, florine, and neon. A number of compounds will also occur, namely the hydrocarbons, such as methane, from the natural interaction of these elements.

The accumulation on Planets #5-#8 will be in standard spherical distribution; the planets closest to the sun will get the most debris, and hence develop the largest atmosphere. The white dwarf fragments will also be producing these gasses in abundance, so the 4 outer planets will be "gas giants", having a thick gaseous atmosphere, surrounding a hot, white dwarf core will a small amount of heavy matter. The ratio of atmosphere to core will decrease as we move outwards to Planet #8. These planets will look like small suns, because they actually *are* small suns, without the miles of rock covering up the cores, as found in the inner planets.

Because these are larger fragments, they remain hot for a longer time, and hence "repel" any white dwarf debris. But gravity still pulls, so the larger chunks of debris end up in orbit around these bodies, as moons. The moons then aggregate the bulk of the supernovæ debris trapped in orbit, and become small "inner-type" planets, rather than having the characteristics of the host planet. The outer planets will have a large number of moons, whereas the inner planets will tend to have few to none.

When the white dwarf debris that makes up the core of a moon drops entirely into the low speed range, it can no longer resist the pull of the host planet, and breaks apart in the gravitational tide, forming a planetary ring, or rings.

In our system, Planets #5 thru #8 are Jupiter, Saturn, Uranus, and Neptune.

The Pluto / Charon System

Our solar system also has one other member, which thru recent observation has proved out to be a dual-planetary system. Pluto, and its moon Charon, have an elliptical orbit that takes the pair inside the orbit of Neptune. Due to this more highly elliptical orbit, and the closeness of Pluto to Charon, it is reasonable to assume that this pair was a small white dwarf fragment that may have chipped off the fragment forming the core of Neptune during the 2nd generation supernovæ, but at a distance from the sun. As such, it shares a near orbital path, but being small in size, has rapidly cooled off. Deprived of the ultra-high speed motion in its core that kept it in a stable orbit, the orbit has begun to decay. The eventual fate of Pluto/Charon will have Charon crashing into Pluto, forming a single planet, which will have an orbit that is more cometary, than planetary. And like all cometary orbits, it will

eventually decay, and fall into the sun (or hit another planet).

The Geophysics of Planets

Having taken a quick exploration of the general planetary characteristics, we will now focus on the geophysics of planets, which may have some rather startling conclusions for your average geophysicist.

To understand the structure and behavior of the planets, it is necessary to understand the foundation upon which it is built—the white dwarf star. The most important characteristic of the white dwarf is that it is an *implosion* product, rather than an *explosion* product. As such, its atoms have expanded in time, rather than in space. There are several important consequence to consider with the white dwarf star:

1) The dwarf star has an inverse density gradient. The heaviest elements are on the surface of the star, and the lightest at the center.

   Also, since the atoms are disbursed in time rather than space, they cannot be measured using spatial detection methods, and the star, itself, *appears* to be composed of what is viewed on the surface: a solid, metallic ball.

2) It is *very* hot. So hot that its radiation is well into the X-ray band.

3) A normal sun will condense and heat up over time, the white dwarf (being inverse) will cool down and *expand* over time.

4) As with all super-luminal matter, transitions occur in quantized jumps, rather than a continuous transition.

5) As matter cools and drops back into space, it appears as light gases in the center of the star. When gas pressure in the white dwarf builds up, it erupt onto the hot surface, combusting, and producing a "novæ" flare.

6) The intermediate speed range within the white dwarf will produce a intense magnetic field.

7) The ultra-high speed ranges at the *surface* of the star will produce thredules, a co-magnetic phenomenon.[7]

The white dwarf fragment that forms the core of the planets exhibit all of these characteristics. Applying this knowledge to what we know about the interior of planets allows us to explain a number of "inexplicable" phenomenon that occurs on this world.

Applying white-dwarf structure to the planetary core fragments, we can determine some of the early geophysical structure. Starting with the "bare fragment" itself, the first process will be cooling and expanding. The original fragment may have only been a few miles in diameter, but would appear to have the full mass of the current planet. As the core cools and expands, gas and light elements will make their way to the surface, changing the white dwarf to a "brown dwarf": a hot, liquid body with a rarefied atmosphere of hydrogen, methane and ammonia (the light gases).

The atom-building process is not exempt from white dwarf fragments. Eventually, the lighter elements will become heavier elements, and sink to the core forming a "normal" density gradient over the inverse density gradient of the core. The region of highest density will be at the core *boundary--not the center of the planet!*

As a depth of matter builds over the core, it will eventually create sufficient insulation to become solid near the outer regions, retaining a liquid metal "outer core" around the white dwarf fragment, which is now the "inner core". Most of this will be in the nickel-iron elemental range, as heavier elements will be combusted, as in the inner workings of a star.

As a result, several thermal ranges will develop. In the outer regions of the outer core, liquid metals will exist, in the low temperature ranges (low temperatures for stars, that is). The central regions of the outer core will have thermal motion in the intermediate speed ranges, generating intense magnetic fields. Right at the boundary of the outer core, ultra-high temperature ranges form, driven by the thermal motion of the white dwarf fragment.

The outer region of the inner core is basically the "stellar interior" of a white dwarf, having an inverse density gradient. It will have motion in the ultra-high speed range as well. Hence, there are two areas from which thredules (co-magnetism) can form. The central regions of the inner core would be in the intermediate speed ranges, again generating an intense magnetic field.

One of the direct results of this structure will be a planetary magnetic field, in two large "belts", generated from the intermediate speed ranges of the outer and inner core, respectively.

As stated in consequences #4 and #5 above, the inner core will flare up at a regular interval, and send hot, explosive gasses into the outer core, where they will detonate, shattering the solid structures above, allowing magma to seep thru the cracks, and form a light layer of magma over the surface of this solid portion.

Meteoric dust and rock are also crashing into the surface, and being mostly of the stony type, are made of light materials that will float on this coating of magma, eventually crusting it over. The constant expansion of the inner core will utilize the outer core as a hydraulic ram, and split the crust into a large number of plates, just like dried mud smeared over the surface of an expanding balloon.

So far, we have identified the geology of the planets as:

1. An inner core, composed of a fragment of a white dwarf sun, having an inverse density gradient, intermediate and ultra-high speed ranges generating magnetic and co-magnetic effects, and anti-gravitational motion.

2. An outer core, composed of liquid nickel-iron, having a normal density gradient, but three distinct temperature zones—a thin, ultra-high temperature region adjacent to the inner core creating short-term, co-magnetic thredules, an intermediate temperature zone, generating a large magnetic field, and a low termperature zone, forming the transition from molten to solid mantle.

3. A solid mantle, surrounding the outer core, of fractured rock, making the outer core boundary irregular.

4. A layer of magma that has seeped thru the cracks in the mantle—the asthenosphere.

5. A solid layer of magma above the asthenosphere that has "crusted over", forming the simatic crust.

6. A thin crust of light materials from meteoric aggregation, cracked into large "tectonic" plates, forming the sialic crust of continents.

So far, we have a fairly accurate description of the geophysics of Mercury, Venus, Earth and Mars, when we compensate for the relative proportions of heat and white dwarf fragment size.

Mercury is mostly "outer core", with a thin mantle that is constantly melted by the proximity of the sun. Little to no crust, or atmosphere, exists.

Venus is much like the Earth at a later stage. All the components are present, in approximately the same ratios.

Mars has a thin outer core and mantle, because of the smaller core size. Otherwise, it is very similar to Earth, and most likely had a hydrosphere and breatheable atmosphere in the past, when the sun was larger and nearer to the planet.

The outer planets follow a similar design, but the actual "planet" is buried beneath thousands of miles of lighter compounds. Due to the larger fragment sizes, the outer planets are still in a stage of having a molten surface, covered by a light liquid/gaseous "mantle." Because there is insufficient insulation between the inner core and the hard surface, a crust cannot form—it is consumed instead.

Magnetic Fields and Poles

The bulk of the data regarding planetary magnetic fields, and the motion of the magnetic poles comes from a study of the Earth. The features recognized are:

1. The magnetic field reverses polarity, at fairly regular intervals.

2. The poles wander about the surface, sometimes appearing in equatorial regions.

3. Two distinct "Van Allen" belts of radiation, formed by charged particles running along magnetic lines of force.

4. Occasional disruption of magnetic fields on the surface of the Earth, typically associated with severe weather, either hurricanes, tornados, or supercell thunderstorms.

The geologic structure of the inner and outer cores explain all of these phenomena. Some familiarity, however, is needed with Prof. K.V.K. Nehru's research on the interior of the sun, the seven states of matter, and the nature of sunspots.[8]

In quick summary, Nehru identifies seven states of matter: solid, liquid, gas, inverse gas, inverse liquid, and inverse solid, and "thredule." The one of interest concerning the magnetic phenomena of the Earth is the last, the thredule—termed "co-magnetic", and is a 1-dimensional magnetic field where like poles attract, and unlike poles repel, are an inward

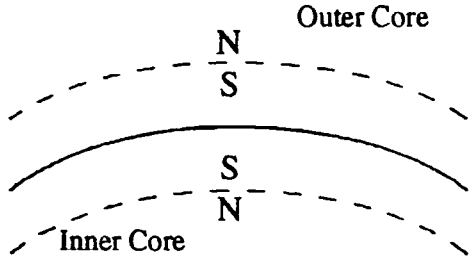
motion (normal magnetism is outward), and form the solar phenomena known as sunspots.

Motion in the ultra-high speed ranges produce the thredule phenomena. In our sun, they originate at the very center from two magnetic sheaths, projecting out like rays. When they pass thru the intermediate ranges in the sun's outer core, a second set of thredules is induced, of the opposite polarity.

The same happens in the white dwarf core of planets, with a couple of important changes. Whereas our sun is a normal, "A component" star, the core of planets are "B component", the inverse of the A component. As such, some of the magnetic operations are "flipped around," and occur multiple times.

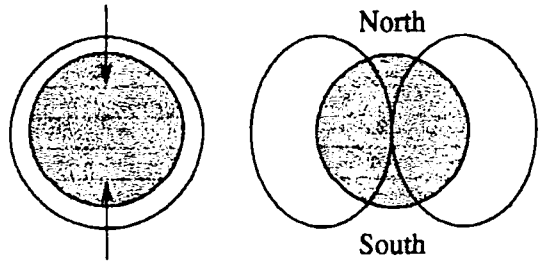
Normally, the thredule sheaths form in the very center of a star. In the white dwarf, they form on the *surface*, not the core, because the surface *is* the white dwarf "stellar interior," where the highest thermal motion takes place.

At the Earth's core, there are two thredule-generating areas. The outer region of the inner core, and the inner region of the outer core. The sheaths formed maintain the same, alternating magnetic polarities:



The thredules from the inner core, being generated from the dwarf fragment component moving in time, are long-duration, existing for perhaps several thousand years. These sheaths form thredules, one projecting north, the other south, and form the magnetic poles (the magnetic poles will *never* coincide with the rotational poles). The toroidal shape of the magnetic field is due to this co-magnetic motion of the polar thredules.

Both the inner and outer cores generate intense magnetic fields, due to their intermediate-speed motion. However, because of the random motions involved in the constituent atoms, the magnetic field has no inherent direction, so it *should* be a spherical distribution. However, enter the thredules from the inner core—a 1-D magnetic pull, in the opposite scalar direction as normal magnetism. This gives the two magnetic fields a "favored direction"—like a child sticking his fingers in opposite sides of a balloon—and produces a toroid, with a definite north or south orientation.



co-magnetic thredules

Just as the sunspot cycles reverse magnetic polarity every sunspot "season", so do planetary magnetic fields, for the same reason. When a magnetic pole first forms, call it the North pole, it will be in the 50-55° latitude range, then drift northward towards the rotational axis. Unlike its sunspot equivalent, there will be only a "North" projected—the south pole will not appear from this thredule, because of the inverse density gradient of the inner core—the south half of this thredule will project into the *center* of the planet, not its surface.

The south pole will be generated by the inner sheath of thredules, again with south pole thredule projecting only (with no induced thredule), and will manifest near the rotational pole, drifting to equatorial regions towards the 50° latitude range.

The time for a polar magnetic reversal can be determined by the locations of the poles. Once the north reaches the 15° area, the inner sheath will start to take dominance, and create a new magnetic pole cycle, of the opposite magnetic polarity. At this time, the planets magnetic field will *appear* to collapse—it does not. The magnetic field is still there, as intense as ever, but has become *random*, because the co-magnetic pull of the inner core at the poles is no longer providing sufficient bias to orient the field, so it slips back to a random, spherical distribution.

Outer Sheath Thredules

The thredules in the lower regions of the outer core are far less energetic than their brethren of the inner core. They have a short life span, and are greatly affected by the sun's magnetic field. The planets, not running precisely along the sun's equatorial projection, will be exposed to the north magnetic field of the sun for half their year, and the south for the other half. This creates a bias in the formation of thredules in the outer core, so there occurs two

periods of thredule formation each year, during the transition, which occur during our spring and autumn seasons.

The short-lived thredules of the outer core form, project thru the crust of the planet, and die off quickly, seldom lasting more than a few days. They are of the opposite polarity of the polar hemisphere they are in—south poles occur in the northern hemisphere, and north in the southern. However, their effect on the surface of the world can be somewhat extreme.

The outer core thredules, on Earth, project thru the simatic crust (ocean floor) with little to no distortion, and upwards into the sky. When projecting thru the continents, both the simatic and sialic crusts, the thredule is scattered and broken down into a number of smaller thredules, spread over a wider area, from the irregular concentration of elements in the sialic crust.

What the thredules do, being a 1-D inward motion in the inverse temperature gradient range, is to produce a super-cold column of air at high altitudes. When over the ocean, this cold air drops to the water, creating updrafts, lifting great quantities of vapor, and forming dense cloud layers, rotating around the original thredule projection, which remains a "clear eye" of downdraft—a hurricane.

When over land, the result is similar—but due to a lower quantity of water vapor, it produces super-cell storms, with tornados resulting from the scattered thredule projections. As such, tornados are more likely to form over flat ground, than mountainous regions, though no topography is excluded.

Even when the thredule dissipates, hurricanes can continue onward from the processes generated during its initiation, but dissipate rather quickly. Hurricanes also dissipate quickly over land, as the thredule driving the center becomes scattered, and the hurricane breaks down into an intense rain storm.

Thredule formation continues for about 3 months, before it weakens to the point where only minor effects on weather take place. When the Earth slides to a new solar polarity, the cycle starts again.

Since the inner core rotates at a slightly different rate than the mantle and crust, there is a general shifting of this phenomena, creating the weather "cycles" that occur over a number of years.

Where Did All the Water Come From?

Earth is unique in our solar system for having an enormous quantity of surface water. Given that the inner core is constantly expanding, and thus the surface area of the Earth is also expanding, and considering that ocean water levels are continuing to rise (as demonstrated by the continental shelf, which was once above the surface and is now 600' below), where does all the water come from?

There is another attribute our world has that is not found on the other worlds of our system—we are covered with life, and an enormous variety of forms. Water and Life must be related.

As it turns out, most land-based ecosystems produce more water than they consume. Plant bacteria in particular, excrete water as a "waste product" by consuming oxygen and hydrocarbons. It is reasonable to assume that our hydrosphere is a by-product of the life of the land. As the amount of life increases, so does the depth of the water. It is a good thing that the Earth is expanding, or we would be a water world by now.

Considering that water is generated by life, rather than a geological process, we can now proceed to refine our view of the crust of the Earth.

Examining the crust, we find that under its original formation, the top layers of the molten asthenosphere solidify, as the lighter elements move to the surface. Over this solid crust of gabbro basalt, meteoric dust and rock fall, forming a second, lighter crust mainly of silica and aluminum (stony meteorites). This is a typical crustal formation of a planet like Venus, where no hydrosphere exists. Geophysicists name these two crustal layers "Simatic" and "Sialic", after the primary elements of their composition—Silicon / Magnesium (gabbro basalt, SIMA for short), and Silicon / Aluminium (or SIAL for short).

The Earth expands; the outer crust (both layers) crack open, and thru the cracks pour magma, which solidifies to more SIMA. We now have a surface where the SIMA is exposed, and at a lower elevation than the surrounding SIAL sitting on top of the SIMA. These great basins become the repositories for the water generated by the microscopic life forms existing in the SIAL layer, and develop into seas and oceans. The SIMA thus forms an underlying, global crust with large cracks, making tectonic plates. The SIAL forms the continents.

The interesting conclusion—life did not form ***in*** the

oceans, life started out on the land, and ***formed*** the oceans, in which higher forms of life evolved, which moved back on to the land. Since the amount of water is constantly increasing on the planet, as the continental shelves were at one time exposed to the air, it is an indication that the time may be near for another quantum expansion of the planet.

Pangaea

Modern theory believes the continents all started out lumped together in a single, supercontinent called Pangaea, where the rest of the world was ocean. Given the analysis of the crust, we find this is incorrect. Indeed, there was at one time, a supercontinent of Pangaea, but the Earth was only a fraction of its current size—the whole of the land mass ***was*** Pangaea comprising the ***entire surface*** of the planet. The oceans had not yet formed.

The expansion due to the cooling of the core cracked Pangaea into a number of large pieces, with magma breaking thru those cracks to fill in the gaps. A core flare occured (the planetary core equivalent of a novæ flare of a white dwarf star. Same cause and reason). The eruption of the explosive gases pushed the Americas apart from Eurasia, along what is now the mid-Atlantic fault. This formed the first ocean bed—the Atlantic.

Water eventually filled in the basin, and formed the Atlantic Ocean.

The next core flare occured in the Pacific basin, pushing Russia apart from North America. Leaving two super-continents, North America-South America-Antartica (then off the west coast of the Americas), and Europe-Africa-Asia-Australia. This created a great number of weak fracture areas in the Pacific basin, which continue to exhibit the bulk of the expansion of the Earth.

A later core flare separated Antartica from the Americas, rolling it off South America to its more southernly position, eventually disconnecting it from the continents, altogether.

If you look at a topography map of the ocean floor, the stretch lines are obvious. Continents are not sliding towards or away from each other vectorially, they are all sliding away from each other, in a scalar fashion—because the Earth is expanding. Oceans will grow wider. Other fractures occur as the surface area of the Earth increases, breaking up the large continents into smaller ones. Eventually, the Earth will be a large, ocean world with many large islands, and no major continents.

Lost Continents

There are three cycles to the expansion of the Earth. The first, and most mild, is the gradual cooling of the core, causing a slow expansion, and minor volcanic and earthquake activity worldwide, as things re-settle.

The second is the intermediate speed matter from the inner core dropping into the low speed (1-x) range. This is not done in a smooth, continuous motion. A threshold is reached, then there is an avalanche effect that causes a great deal of matter to drop out of motion in time, back to motion in space. Take, for example, motion defined as s/t. A motion of 5 units, in time, would be defined as 1/5, or as it would appear in space, 0.20. When those 5 temporal units invert, and become 5 units of space, 1/5 becomes 5/1—what was 0.2 meters, is now 5 meters—a major expansion in volume occurs at the core of the planet.

This causes the plates, world-wide, to separate and exposes the magma of the asthenosphere to whatever is above, typically water. With wide gaps between the plates sitting on the molten, slippery asthenosphere are free to move, in relation to each other, as well as over the mantle of the crust.

Because the Earth is rotating, the plates will seek the "least energy" configuration. The largest continental bulge will tend to become equatorial. In most cases, this is one of the polar ice caps, with ice piled miles high. Thus, the plates containing these ice caps will slide to equatorial positions, normally turning the surface of the Earth 90° from its prior position. This would be a regular, and predictable, phenomenon.

The final cycle of expansion is the "core flare", when enough gas is produced in the center of the core (the low density area), to generate sufficient gas pressure to break thru the inner core, and into the molten outer core, and explode—the core flare. This has a devastating effect on the surface of the planet. The thermal release will break thru a section of the mantle, literally blowing a several-mile-wide volcano in the surface of the planet to release the pressure. Enormous quantities of material will be pushed to the surface, causing another sudden increase of surface area, but localized to a region, rather than distributed globally. This outburst would most likely coincide with the second cycle, but not always occur. Again, it would probably be at a fairly regular interval, with a number of Cycle 2 events occuring between.

The results of this core flare could split a section off

a continent, and push it several hundred miles away from its parent in a matter of a few days.

Consider a tribe living in a coastal area, with a large island visible to the west. The core flare occurs, and volcanism and earthquakes flare up all around for several days. The activity dies down, and they look to their west, and see nothing but muddy waters of the ocean, bubbling with volcanic remnants. Their reasonable conclusions: the gods have gotten angry, and sank the island continent to the west. In reality, the coast was the fracture zone, and that island just moved over the horizon, where it can no longer be seen, and will probably continue to move rapidly for several decades. The volcanoes and muddy waters make it look like the continent had sunk; in reality, it just moved a great distance in a short time.

We find evidence of this in the legends of Mu, Atlantis, Lemuria, and "Ancient Lanka (Ceylon)". Ancient Lanka was supposed to exist off of the west coast of India, where a series of islands now exist. However, since the water levels were much lower then, those islands were part of the coastal mountains of India. The topography of the ocean floor at that point indicates only simatic crust—no continental mass. However, by following the fracture zones and stretch marks, the ancient island of Lanka can be found.

Lanka is also known by the name Lemuria, named after the Lemurs found in both India and Africa, but not in any of the intervening lands. It was assumed a land bridge once spread between Africa and India, allowing these creatures to cross freely. And so was the case. Consider:

> "Because many of its animals, plants and rocks resemble those of Africa, some think that... was at one time connected to that continent. But it has also plants and animal seemingly of East Indian origin. This is the basis for supposing it to be a remnant of a continent called Lemuria, which is believed to have filled, in ages gone by, the central basin of the Indian Ocean." [Comptons Encyclopaedia, Vol 9, 1946]

When the Earth's size is reduced, as it was ages ago, and island ***does*** connect India to Africa—the island of Madagascar. Madagascar IS Lemuria/Ancient Lanka. (The island seemed much bigger, then, because it Earth was smaller).

The same is true for Atlantis. Prior to the last major expansion, Antartica was tropical and much closer to Africa and South America. North America was at the North Pole, and in an "Ice Age" (Ice Ages occur when the crust is reoriented so the place having the ice age is near one of the polar points). Antartica IS Atlantis. And Atlantis will "rise again", when the next core flare occurs, as it now has the bulk of the elevated mass of the planet piled up in its ice sheets. When the crust slips, that bulk will become equatorial, and melt. However, all the remains of Atlantis are now crushed into sand, by the massive sheets of ice.

Continuing extrapolation shows that Mu was the continent of North and South America combined with Antartica, just after the formation of the Pacific basin. The core flare formed the basin, and pushed Antartica off of America, rolling it south. Those survivors in America saw the continent of the west disappear, leaving only mud and volcanism. But it really isn't gone, just relocated.

Predicting Cycles of Destruction

Of the three cycles identified, the latter two can be predicted—and perhaps have been for many generations. If we look to India, there are records going back many thousands of years. They indicate that there are two cycles, known as "Yugas." A minor yuga is about 6,000 years. A major yuga is 4 minor yugas, or 24,000 years. I believe these represent approximations of the 2nd and 3rd destructive cycles of the core.

On the other side of the world, we have the sacred calendar of the Aztec and Maya, handed down from their ancestors, the Toltec, handed down from the people of Iltar, who migrated there when their home of Aztlan was destroyed. The Maya also have similar cycles, but hold a great deal more precision. The minor cycle occurs every 1,872,000 days, or about 5,125 years. The major cycle is 5 of the minor cycles, or 25,627 years (which is also a very close figure for the precession of the equinoxes).

Both systems indicate that the current major cycle will end within the next 20 years, around 2000 for the Yuga cycle, and on December 23, 2012 for the Mayan cycle. The Mayan date, though precise, may not be as accurate as hoped for, because there are errors in the current Julian calendar that may have caused an errorneous start date for the Mayan calendar. The actual Mayan 'end time' could be as early as 2003.

As for a more scientific determination, it is difficult, as there is no prior data to base a theory on. Several features can be isolated, to aid in determining a date.

For example, there will be a large drop in the Earth's magnetic field (the geomagnetic field has dropped 38% in the last 2000 years). A new south magnetic pole will begin to form in the northern hemisphere, near 50° N latitude (according to KVK Nehru's sunspot research, extrapolated for the Earth's core). This new south pole will cause some unusual phenomenon, as being co-magnetic in nature, will cause the existing magnetic field to collapse at that point, allowing gamma rays to penetrate to ground level, causing sterility in the area of the new pole, as well as unusual magnetic, electric, and gravitational effects. There is one particular area on the Earth, at 52° N latitude, that fits this description—the Salisbury plains in England, in the area of Stonehenge, where the crop circle phenomenon is building. Observation agrees with mysticism—a "pole shift" is coming sometime soon.

Post-Cataclysm Earth

What will happen if a core flare occurs say, for example, in the springtime of 2003? Mayan records indicate that the earth trembled with volcanoes and earthquakes for 3 days. The sun and moon stopped in the sky, then moved "crazily" in different directions. Then they were blocked out by clouds, and the sun did not shine again on the land for 26 years (due to the volcanic ash and dust thrown into the atmosphere).

The Hopi describe it as:

> "The twins [the two gods who hold the rotational poles in place] had hardly abandoned their stations when the world, with no one to control it, teetered off balance, spun around crazily, then rolled over twice. Mountains plunged into the seas with a great splash, seas and lakes sloshed over the land; and as the world spun through cold and lifeless space it froze into solid ice."[10]

The equatorial paradise of the ancient Hopi had been relocated to the artic region of the new poles.

In Norse mythology, "Sibyl's Vision" says of Ragnarok (the final battle, where the gods are destroyed), "The sun will go black, earth sink into the sea, heaven be stripped of its bright stars; smoke rage and fire, leaping the flame lick heaven itself."[11]

From the Christian Bible, Revelation 6:12:

> "And I beheld when he had opened the sixth seal, and, lo, there was a great earthquake; and the sun became black as sackcloth of hair, and the moon became as blood; and the stars of heaven fell unto the earth, even as a fig tree casteth her untimely figs, when she is shaken of a mighty wind. And the heaven departed as a scroll when it is rolled together; and every mountain and island were moved out of their places."

Virtually all mythos has a similar description of the "end times", which seem to recur. The native tribes of the Americas describe 4 such destructions in their history. The Yuga system describes 3 such cycles, others describe many more. All the recent destructions seem to fit near these time frames, obtained from ancient records. Note that the dates *do not* correspond with geologic time scales.

Ancient Records (BCE)	Geologic Period (BCE)	Era / Comments
75,000	100,000,000	*Cretaceous* breakup of Mu
50,000	65,000,000	*Paleocene* 2nd breakup of Mu 1st breakup of Atlantis
24,000	45,000,000	*Eocene* 2nd breakup of Atlantis
16,000	12,000,000	*Oligocene* Lemuria disappears
9,600	10,000	*Modern* final sinking of Atlantis
3,114	4,000	*Modern* Start of Mayan calendar

It is interesting to note how the "ancient records" greatly differ in time scales from modern geologists. When examining the methods of long-term dating, I did discover that there is a cumulative, expotential error in geologic dating that relies on radioactive decay. Anything beyond the 5,000-year range of carbon dating may be drastically wrong, and the Earth may be much younger than ever conceived–by as much as a factor of 1,000:1. The 4.6 billion year age of the Earth, may be as little as 500 million, and mankind may have been present when dinosaurs walked the Earth, as actually shown etched in ancient Peruvian stone tablets. Also, recent fossil evidence in Texas is supporting this hypothesis—much to the objection of anthropologists—having found human footprints petrified in rock next to dinosaur tracks, as though the humans were hunting the dinosaurs. Originally thought a hoax, until they discovered the tracks continued under a large cliff, and when excavated, showed the same human/dinosaur prints.

It appears that a major disruption of the Earth's surface is due, as well as a magnetic pole shift. It may be possible to determine where the breaks will occur; plate tectonics are fairly well defined, but typically limited to oceans. Breaks under the continental crust can also be identified by the separation of land masses, and mountain ranges.

Conclusion

This preliminary investigation into Reciprocal Geophysics brings out a lot of concepts and ideas not likely to be accepted as a "matter of fact." However, it does provide a more consistent view than the ad-hoc collection of theories now used to try to explain the planet, its history, and its phenomenon. I consider this a starting point, needing much refinement and extrapolation. It offers the opportunity to get to the nature of many of the "core" problems our world faces, and also offers a basis to start correction.

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Filler Needed

Quite frequently, articles do not take up all the space they could, to fill to the bottom of a page. The gap left over is called "filler".

Filler is used to present quick quotes, brief opinions, interesting tidbits of information, and other comments that are not part of the general article structure of *Reciprocity*. What you are now reading is "filler."

There is always a need for filler in each issue of *Reciprocity*, and it can take some time to dig up interesting bits of information, quotes, or commentary, as I am doing right now—looking for things to put in the blank spaces after articles.

So, if you have a comment on something, an observation, a favorite quote, a plug for the *Reciprocal System*, or a new idea you haven't quite flushed out yet, write up a paragraph or two, and send it in to the editor as filler. Anything from a few words, to about a page and a half is fine.

It is easiest to e-mail the filler, using either plain text or rich text format (please use 11-point "Times" font). "Rich Text" supports boldface, italic, and underline for emphasis and highlighting.

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—Bruce Peret, *Editor*

Language, Experience and Illusion

Prof. K.V.K. Nehru, Ph.D.

[Originally published in **The Theosophist**, *(June 1993, pp. 339–345) under the title* "Language, the Slayer of the Real." *The article is revised (1998) and adopted for* **Reciprocity** *since it brings to light some of the epistemological difficulties that beset the dissemination of a new basic paradigm as in the case of the* ***Reciprocal System.****]*

One of the many obstacles that a serious student of spirituality has to face is language. One uses it not only for communication, but to organize one's thinking, to direct reason and analyze nature. Sooner or later, he has to come to a clear and thorough understanding of how language distorts truth. As members of the human Brotherhood we are divided by thousands of languages. Not only man is alienated from man by language, but also more sinisterly, man is alienated from Reality by the language he uses. There are two functional levels in language: the lexical and the patternment. The lexical level is more directly concerned with *meaning* in expressing and communicating. There are plenty of traps in this. We would like to dwell, in this article, on the patternment level, which conditions us more deeply, through grammatical forms and other structural features.

The task is exceedingly difficult, if possible at all in its several implications, but worth trying. We would like to expose some subtle traps laid by language. But there is a vicious circle here: namely, the fact that we have to use the same language as a tool of explanation to show the traps that exist in it. We never notice any conditioning factor that occurs constantly and without exception. It then forms part of the background of experience, of which we tend to remain unconscious. Consider, for example, the force of gravity or the pressure of the atmosphere acting on our physical bodies. We are never aware of their existence unless an artificial situation is created in which they are made conspicuous by their absence—like in a free-fall or in deep diving. In a similar fashion the language of our community is a constantly occurring factor into which we are born and in which we are continually bred. Our intellectual processes have been so developed from the very beginning in the medium of language that it requires the utmost detachment and celerity to understand its traps. Even after explaining how the conditioning takes place in a specific instance, one may continue to see—as a hypnotic subject does—the salient feature being pointed out *as given in nature*, rather than as the result of conditioning by language. Illumination dawns only if one does not close the door of observation too soon.

The January and April issues of *The Theosophist* of 1942 carry a momentous article entitled 'Language, Mind and Reality' by Benjamin Lee Whorf. Whorf was a Theosophist and an authority in linguistics. He began his career by working for an insurance company. Once while investigating the case of a fire in a fuel company stockyard, he noticed a signboard there written 'empty barrels.' He found that those words tended to misguide, making one believe that 'empty' barrels are dangerless, leading someone to throw a lighted cigarette butt. The residual fuel from the unsealed empty barrels, evaporated in the heat of the day, had charged the atmosphere with inflammable mixture that resulted in the fire. Whorf realized how much one's behavior is controlled by language, and he turned to study linguistics and he came up with valuable discoveries.

Whorf and his teacher Edward Sapir state: "Human beings do not live in the objective world alone, nor alone in the world of social activity as ordinarily understood, but are very much at the mercy of the particular language which has become the medium of expression for their society... The fact of the matter is that the 'real world' is to a large extent unconsciously built up on the language habits of the group... We see and hear or otherwise experience very largely as we do because the language habits of our community predispose certain choices of interpretation."[1]

The Actual and the Factual

We are inclined to think of a world of facts as against a world of words that describe these facts. Dr. Friedrich Weissmann points out: "What is called a fact depends on the linguistic medium through which we see it... What rebels in us against such a suggestion is the feeling that the fact is there objectively no matter in which way we render it. I perceive something that exists and put it into words. From this it seems to follow that fact is something that exists independent of and prior to, language... What we are liable to overlook here is that the way we see a fact—that is, what we emphasize and what we disregard—is our work... A fact is something that emerges out from, and takes shape against a

of sugar.' In these cases, if we withdraw the contents we are left with no container. But the linguistic pattern is identical and so while it denotes contents in the obvious cases, it suggests contents in the other, inobvious cases. The heaps, blocks, sticks and lumps *seem* to contain something, a 'stuff' so to say. In fact, the philosophic notion of substance or matter can be seen to arise out of this naïve linguistic practice.

Whorf explains: "Our language patterns often require us to name a physical thing by a binomial that splits the reference into a formless item plus a form... Thus with our binomial formula we can say and think a 'moment of time,' a 'second of time,' or a 'year of time.'... the pattern is simply that of a 'bottle of milk' or a 'piece of cheese.' Thus we are assisted to imagine that a 'summer' actually contains or consists of such-and-such a quantity of 'time.'

"In Hopi...one does not say 'it's a hot summer' or 'summer is hot;' summer is not hot, summer is only *when* conditions are hot...one does not say 'this summer,' but 'summer now' or 'summer recently.' There is no objectification, as a region, an extent, a quantity, of the subjective duration feeling. Nothing is suggested about time except the perpetual 'getting later' of it. And so there is no basis here for a formless item answering to our 'time'."[7]

Temporal Verbs

The three-tense system of past, present and future is in congruence with this objectified time, and colors all our thinking about time. In Hopi, on the other hand, one finds a two-tense system, of earlier and later, which corresponds better with the actual experience of duration. "If we inspect consciousness we find no past, present or future but a unity embracing complexity. *Everything* is in consciousness, and everything in consciousness *IS* and is together... Where real time comes in is that all this in consciousness is 'getting later,' changing certain relations in an irreversible manner... We can of course *construct and contemplate in thought* a system of past, present and future, in the objectified configuration of points on a line. This is what our general objectification tendency leads us to do and our tense system confirms."[8]

Adjectives Doing for Verbs

Consider, for example, how we express color: we render it by adjectives. We say 'the green pasture.' This practice makes us see color as a 'quality' or 'attribute' of things. This enables us to abstract color and see it in artificial isolation, 'greenness' by itself. Now in Russian and Italian color is rendered by verbs, something like 'the pasture greens.' Color is seen as an activity or modification that cannot be abstracted out from the thing. We say 'the light shines,' 'the stream shimmers' or 'the teeth gleam.' In this usage we cannot detach the glitter or the gleam from the thing, like a smile cannot be from the face. Thus, adjectival and verbal modes of rendering represent two different worlds of thought and the whole way in which a fact articulates itself is contingent on the linguistic modes adopted.

Spatial Metaphors

We say 'a long time,' 'a short while,' 'deep sorrow,' 'an elevating influence;' we say 'we do not *grasp* the *line* of so-and-so's thinking, since he never *comes* to the *point*'. This pattern is part of our objectification syndrome. It suggests an imaginary space into which we are inveigled to locate non-spatial items and *see them there*. But in Hopi abundant linguistic devices express intensity, tendency and duration directly, and there is no space term to be pressed into service when space is not involved. Thus the Hopi thought-world has no imaginary space. It does not locate a thought dealing with real space anywhere but in real space. It does not therefore see that physical things are in any way insulated from the powers of thought and life.

Nouns versus Verbs

Nouns and verbs have different grammatical and logical properties. English prefers nouns, Hopi, verbs. We tend to say 'I had a bad dream' rather than 'I dreamt badly.' It is part of our objectifying tendency. Sadly, this strips what is being talked about of all vividness. Consider the noun 'dream' and the verb 'to dream' or 'dreaming.' In the former we objectify, isolate and look at 'dream' as though it were a 'thing.' Spontaneity, the distinguishing quality of life from form is conveyed by the verb, whereas the noun reifies it into a thing. Regrettably, in English, some of the most important words that denote or ought to denote activity *per se* have no seminal verb at all! Examples are: 'awareness,' 'consciousness,' intelligence' and 'wisdom.' If we can coin 'consce' and 'intellige' as the verb forms of 'consciousness' and 'intelligence,' we see what a world of difference it makes to say 'I consce' or 'the creature consces' or 'he intelliges.'

Our preference for nouns lands us in another oddity. We first 'de-integrate' the whole and then look at it as a sum of its parts. For example, in a fountain, a river and a pond, we are able to see water as the

common element. This makes us see a river as water *plus* flowing. Thus we fail to see the reality as it is. In Hopi, on the contrary, a fountain, a river and a pond, not only have different names but the linguistic pattern does not instigate them to abstract any 'thing,' like 'water,' from a fountainous form or a rivery flow. They appreciate each situation holistically.

Whorf observes that while the habitual thought of speakers of our language (with its preference for nouns) analyzes reality largely in terms of 'things' or bodies plus formless items like 'matter' or 'substance,' the Hopi thought-world analyzes largely in terms of 'events,' or more aptly 'eventings.' He remarks: "From the form-plus-substance dichotomy...belong materialism, psycho-physical parallelism...and dualistic views of universe in general... Newtonian space, time and matter are no intuitions. They are receipts from culture and language. That is where Newton got them."[9] Hard to believe, but true!

Rûpa and Arûpa Levels

Whorf[10] recognizes two principal levels in a language structure, the *rûpa* and the *arûpa* levels of the plane of *manas*. He identifies the lower level with the process of giving names to the parts of the whole flux of experience, with the rûpa or the realm of name and form (form meaning organization in three-dimensional space). By naming, these parts are made to stand in an artificial isolation. See, for example, how the words 'hill' or 'swamp' entice us to regard them as referring to discrete things in themselves, while in truth they are nothing more than local variations in altitude or soil consistency as the case may be.

The next level of language he calls the level of 'patternment' and identifies with the arûpa levels of mind. Arûpa, formless, means that there is no reference to the spatial form (visual shape), which is the salient feature of the rûpa levels. It is a realm of syntactical patterns and grammatical structures. Whorf notes: "Such patterns are not like the meanings of words, but they are somewhat like the way meaning appears in sentences... Because of the systematic, configurative nature of the higher mind, the 'patternment' aspect of language always overrides and controls the 'lexation' or name-giving aspect... The context or sentence pattern determines what sort of object the...word refers to."

For example, the sentence 'I hold it' has the same pattern as that of 'I lift it,' 'I push it' or 'I hit it,' all of which depict overt action. However, 'hold,' does not imply any action or movement. It is rather a statement of relative positions. Nonetheless, we imagine—nay, we *see*—'hold' depicting action in the above sentence. This is simply because the proposition is set up on the same pattern as that of the other examples that do denote action or movement.

The formula, "*substantive + verb = actor + his action*," is implicit in our sentence structure. This pattern prompts us to read into nature non-existent actors or agents simply because our sentence structure (when not imperative) demands a substantive for a verb. We say 'it rains,' when 'rains' itself suffices for the reality: we set up an actor 'it' to perform the action. To quote Whorf: "Hopi can have verbs without subjects...(we) unknowingly project the linguistic patterns of a particular type of language upon the universe, and SEE them there, rendered visible on the very face of nature... A change in language can transform our appreciation of the cosmos...science...has not yet freed itself from the illusory necessities of common logic which are only at bottom necessities of grammatical pattern in Western Aryan grammar; necessities for substances which are only necessities for substantives in certain sentence positions, necessities for forces, attractions, etc. which are only necessities for verbs in certain other positions, and so on."

James Jeans, the Astronomer Royal, quoting Bertrand Russell states: "...grammar and ordinary language are bad guides to metaphysics...In illustration he mentions Descartes, who thought that there could not be motion unless something moves, nor thinking unless someone thought...This view springs from a notion—usually unconscious—that the categories of grammar are also the categories of reality.

"When it had become clear that light was of an undulatory nature, physicists argued that if there were undulations, there must be something to undulate—one cannot have a verb without a noun. And so the luminiferous ether became established in scientific thought as the nominative of the verb 'to undulate,' and misled physics for over a century."[11]

When Dewey Larson propounded the **Reciprocal System of Theory**, the first completely successful general theory of physics, which postulates that the most basic (and the only) constituent of the physical universe is *motion*, scientists came up with the same objection that there can be no motion without anything moving. It took quite some time for them to realize that in a universe of motion the primary

entity ought to be motion, and that all the 'things' of the universe—matter, electricity, magnetism, radiation, gravitation etc.—are different manifestations of the primary motion.

The noun-dominated languages, with their tendency to objectify and isolate are well suited for conceptualization and the progress of science. But in the same proportion, they cause us to recede from Reality.

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THE ROUGH RIDER

"Far better it is
to dare mighty things,
than to take rank with
those poor, timid spirits
who known neither
victory nor defeat."

—Theodore Roosevelt, 1899

"One small step for man...

One giant leap, for Mankind."

—Neil Armstrong, 1969

As an aggregate of matter, man is still dwarfed by his physical surroundings, but this investigation has revealed that the physical aspect is a relatively unimportant facet of human existence, and that the size and the performance of physical functions, are wholly invalid. According to our findings, the physical universe accomplishes nothing on its own account; it exists only for the purpose of facilitating the development of the more advanced aspects of intelligent life: to aid man and his relatives on other planets to make progress toward their final goal. Our universe of motion is only one portion—perhaps no more than a very small portion—of a larger system. But we human beings are not limited to this small portion of the whole; we are citizens of the greater cosmos, and we will find our ultimate destiny in that wider field.

—Dewey B. Larson, 1990

The Dimensions of Motion

Dewey B. Larson

[This article includes references to "the preceding article", *but I have not been able to determine what that article was. —Ed.]*

Now that the existence of scalar motion has been demonstrated, it will be appropriate to examine the consequences of this existence. Some of the most significant consequences are related to the dimensions of this hitherto unrecognized type of motion. The word "dimension" is used in several different senses, but in the sense in which it is applied to space it signifies the number of independent magnitudes that are required for a complete definition of a spatial quantity. It is generally conceded that space is three-dimensional. Thus three independent magnitudes are required for a complete definition of a quantity of space. Throughout the early years of science this was taken as an indication that the *universe* is three-dimensional. Currently, the favored hypothesis is that of a four-dimensional universe, in which the three dimensions of space are joined to one dimension of time.

Strangely enough, there does not appear to have been any critical examination of the question as to the number of dimensions of *motion* that are possible. The scientific community has simply taken it for granted that the limits applicable to motion coincide with those of the spatial reference system. On reviewing this situation it can be seen that this assumption is incorrect. The relation of any one of the three space magnitudes to a quantity of time constitutes a scalar motion. Thus three dimensions of scalar motion are possible. But only one dimension of motion can be accommodated within the conventional spatial reference system. The result of any motion within this reference system can be represented by a vector (a one-dimensional expression), and the resultant of any number of such motions can be represented by the vector sum (likewise one-dimensional). Any motions that exist in the other two dimensions cannot be represented.

Here again we encounter a shortcoming of the reference system. In our examination of the nature of scalar motion we saw that this type of motion cannot be represented in the reference system in its true character. The magnitude and direction attributed to such a motion in the context of the reference system are not specifically defined, but are wholly dependent on the size and position of the object whose location constitutes the reference point. Now we find that there are motions which cannot be represented in the reference system in *any* manner. It is therefore evident that the system of spatial coordinates that we use in conjunction with a clock as a system of reference for physical activity gives us a severely limited, and in some respects inaccurate, view of physical reality. In order to get the true picture we need to examine the whole range of physical activity, not merely that portion of the whole that the reference system is capable of representing.

For instance, gravitation has been identified as a scalar motion, and there is no evidence that it is subject to any kind of a dimensional limitation other than that applying to scalar motion, in general. We must therefore conclude that gravitation *can* act three-dimensionally. Furthermore, it can be seen that gravitation *must* act in all of the dimensions in which it *can* act. This is a necessary consequence of the relation between gravitation and mass. The magnitude of the gravitational force exerted by a material particle or aggregate (a measure of its gravitational motion) is determined by its mass. Thus mass is a measure of the inherent negative scalar motion content of the matter. It follows that motion of any mass m is a motion of a negative scalar motion. To produce such a compound motion, a positive scalar motion v (measured as speed or velocity) must be applied to the mass. The resultant is mv, now called momentum, but known earlier as "quantity of motion," a term that more clearly expresses the nature of the quantity. In the context of a spatial reference system, the applied motion v has a direction, and is thus a vector quantity, but the direction is imparted by the coupling to the reference system and is not an inherent property of the motion itself. This motion therefore retains its positive scalar status irrespective of the vectorial direction.

In the compound motion mv, the negative gravitational motion acts as a resistance to the positive motion v. The gravitational motion must therefore take place in all three of the available dimensions, as any one of the three may be parallel to the dimension of the reference system, and there

would be no effective resistance in any vacant dimension. We may therefore identify the gravitational motion as three-dimensional speed, which we can express as s^3/t^3, wher s and t are space and time respectively. The mass (the resistance that this negative gravitational motion offers to the applied positive motion) is then the inverse of this quantity, or t^3/s^3. Since only one dimension of *motion* can be represented in a three-dimensional spatial coordinate system, the gravitational motion in the other two dimensions has no directional effect, but its magnitude applies as a modifier of the magnitude of the motion in the dimension of the reference system.

We now turn to a different kind of "dimension." When physical quantities are resolved into component quantities of a fundamental nature, these component quantities are called *dimensions*. The currently accepted systems of measurement express the dimensions of *mechanical* quantities in terms of mass, length, and time, together with the dimensions (in the first sense) of these quantities. But now that mass has been identified as a motion, a relation between space and time, all of the quantities of the mechanical system can be expressed in terms of space and time only. For purposes of the present discussion the word "space" will be used instead of "length," to avoid implying that there is a some dimensional difference between space and time. On this basis the "dimensions," or "space-time dimensions" of one-dimensional speed are space divided by time, or s/t. As indicated above, mass has the dimensions t^3/s^3.

The product of mass and speed (or velocity) is

$$t^3/s^3 \times s/t = t^2/s^2.$$

This is "quantity of motion," or momentum. The product of mass and the second power of speed is

$$t^3/s^3 \times s^2/t^2 = t/s,$$

which is energy. Acceleration, the time rate of change of speed, is

$$s/t \times 1/t = s/t^2.$$

Multiplying acceleration by mass, we obtain

$$t^3/s^3 \times s/t^2 = t/s^2,$$

which is force, the "quantity of acceleration," we might call it. The dimensions of the other mechanical quantities are simply combinations of these basic dimensions. Pressure, for instance, is force divided by area,

$$t/s^2 \times 1/s^2 = t/s^4.$$

When reduced to space-time terms in accordance with the foregoing identifications, all of the well-established mechanical relations are dimensionally consistent.

To illustrate this agreement, we may consider the relations applicable to angular motion, which take a different form from those applying to translational motion, and utilize some different physical quantities. The angular system introduces a purely numerical quantity, the angle of rotation θ. The time rate of change of this angle is the angular velocity ω, which has the dimensions

$$\omega = \theta/t = 1/t.$$

Force is applied in the form of torque, L, which is the product of force and the radius, r.

$$L = Fr = t/s^2 \times s = t/s.$$

One other quantity entering into the angular relations is the moment of inertia, symbol I, the product of the mass and the second power of the radius.

$$I = mr^2 = t^3/s^3 \times s^2 = t^3/s.$$

The following equations demonstrate the dimensional consistency achieved by this identification of the space-time dimensions:

$$\text{energy } (t/s) = L\,\theta = t/s \times 1 = t/s$$

$$\text{energy } (t/s) = \tfrac{1}{2}I\omega^2 = t^3/s \times 1/t^2 = t/s$$

$$\text{power } (1/s) = L\omega = t/s \times 1/t = 1/s$$

$$\text{torque } (t/s) = \tfrac{1}{2}I\omega^2 = t^3/s \times 1/t^2 = t/s$$

The only dimensional discrepancy in the basic equations of the mechanical system is in the gravitational force equation, which is expressed as

$$F = Gmm'/d^2,$$

where G is the gravitational constant and d is the distance between the interacting masses. Although this equation is correct mathematically, it cannot qualify as a theoretically established relation. As on physics textbook puts it, this equation "is not a defining equation... and cannot be derived from defining equations. It represents an *observed*

relationship." The reason for this inability to arrive at a theoretical explanation of the equation becomes apparent when we examine it from a dimensional standpoint. The dimensions of force in general are those of the product of mass and acceleration. It follows that these must also be the dimensions of any specific force. For instance, the gravitational force acting on an object in the earth's gravitational field is the product of the mass and the "acceleration due to gravity." These same dimensions must likewise apply to the gravitational force in general. When we look at the gravitational equation in this light, it becomes evident that the gravitational constant represents the magnitude of the acceleration at unit values of m' and d, and that these quantities are dimensionless ratios. The dimensionally correct expression of the gravitational equation is then $F = ma$, where the numerical value of "a" is Gm'/d^2.

The space-time dimensions of the quantities involved in current electricity can easily be identified in the same manner as those of the mechanical system. Most of the measurement systems currently in use add an electric quantity to the mass, length and time applicable to the mechanical system, bringing the total number of independent base quantities to four. However, the new information developed in the foregoing paragraphs enables expressing the electrical quantities of this class in terms of space and time only, in the same manner as the mechanical quantities.

Electrical energy (watt-hours) is merely one form of energy in general, and therefore has the energy dimensions, t/s.

Power (watts) is energy divided by time, $t/s \times 1/t = 1/s$.

Electrical force, or voltage (volts) is equivalent to mechanical force, with the dimensions t/s^2.

Electric current (amperes) is power divided by voltage. $I = 1/s \times s^2/t = s/t$. Thus current is dimensionally equal to speed.

Electrical quantity (coulombs) is current multiplied by time, and has the dimensions $Q = I\,t = s/t \times t = s$.

Resistence (ohms) is voltage divided by current, $R = t/s^2 \times t/s = t^2/s^3$. This is the only one of the basic quantities involved in the electric current phenomenon that has no counterpart in the mechanical system. Its significance can be appreciated when it is noted that the dimensions t^2/s^3 are those of mass per unit time ($t^3/s^3 \times 1/t = t^2/s^3$).

The dimensions of other electrical quantities can be obtained by combination, as noted in connection with the mechanical quantities. As can be seen from the foregoing, the quantities involved in the current electricity are dimensionally equivalent to those of the mechanical system. We could, in fact, describe the current phenomena as the mechanical aspects of electricity. The only important difference is that mechanics is largely concerned with the motions of individual units or aggregates, while current electricity deals with continuous phenomena in which the individual units are not separately identified.

The validity of the dimensional assignments in electricity, and the identity of the electrical and mechanical relations, can be verified by reducing the respective equations to the space-time basis. For example, in mechanics the expression for kinetic energy (or work) is $W = \frac{1}{2}mv^2$, the dimensions of which are $t^3/s^3 \times s^2/t^2 = t/s$. The corresponding equation for the energy of the electric current is $W = I^2Rt$. As mentioned above, the product Rt is equivalent to mass, while I, the current, has the dimensions of speed, s/t. Thus, like the kinetic energy, the electrical energy is the product of mass and the second power of speed, $W = I^2Rt = s^2/t^2 \times t^2/s^3 \times t = t/s$. Another expression for mechanical energy is force times distance, $W = Fd = t/s^2 \times s = t/s$. Similarly, relations of current electricity are likewise dimensionally consistent, and equivalent to the corresponding mechanical relations, when reduced to space-time terms.

Identification of the space-time dimensions of electrostatic quantities, those involving electric charge, is complicated by the fact that in present-day physical thought electric charge is not distinguished from electrical quantity. As we have seen, electric quantity is dimensionally equivalent to space. On the other hand, we can deduce from the points brought out in the preceding article that electric charge is a one-dimensional analog of mass, and is therefore dimensionally equivalent to energy. This can be verified by consideration of the relations involving *electric field intensity*, symbol E. In terms of charge, the electric field intensity is given by the expression $E = Q/s^2$. But the field intensity is defined as force per unit distance, and its space-time dimensions are therefore $t/s^2 \times 1/s = t/s^3$. Applying these dimensions to the equation $E = Q/s^2$, we obtain $Q = Es^2 = t/s^3 \times s^2 = t/s$.

As long as the two different quantities that are called by the same name are used separately, their practical

application is not affected, but confusion is introduced into the theoretical treatment of the phenomena that are involved. For instance in the relations involving capacitance (symbol C), $Q = t/s$ in the basic equation $C = Q/V = t/s \times s^2/t = s$. The conclusion that capacitance is dimensionally equivalent to space is confirmed observationally, as the capacitance can be calculated from geometrical measurements. However, the ususal form of the corresponding energy equation is $W = QV$, reflecting the definition of the volt as one joule per coulomb. In this equation, $Q = W/V = t/s \times s^2/t = s$. Because of the lack of distinction between the two usages of Q the quantity CV, which is equal to Q in the equation $C = Q/V$ is freely substituted for Q in equations of the $W = Q/V$ type, leading to results such as $W = C/V^2$, which are dimensionally incorrect.

Such findings emphasize the point that the ability to reduce all physical relations to their space-time dimensions provides us with a powerful and effective tool for analyzing physical phenomena. Its usefulness is clearly demonstrated when it is applied to an examination of *magnetism*, which has been the least understood of the major areas of physics. The currently accepted formulations of the various magnetic relations are a mixture of correct and incorrect expressions, but by using those that are most firmly based it is possible to identify the space-time dimensions of the primary magnetic quantities. This information then enables correcting existing errors in the statements of other relations, and establishing dimensional consistency over the full range of magnetic phenomena.

In carrying out such a program we find that magnetism is a two-dimensional analog of electricity. The effect of the added dimension is to introduce a factor t/s into the expressions of the relations applicable to the one-dimensional electric system. Thus the magnetic analog of an electric charge, t/s, is a magnetic charge, t^2/s^2. The existence of such a charge is not recognized in present-day magnetic theory, probably because there is no independent magnetically-charged particle, but one of the methods of dealing with permanent magnets makes use of the concept of the "magnetic pole," which is essentially the same thing. The unit *pole strength* in the SI system, the measurement system now most commonly applied to magnetism, is the weber, which is equivalent to a volt-second , and therefore has the dimensions $t/s^2 \times t = t^2/s^2$. The same units and dimensions apply to magnetic flux, a quantity that is currently used in most relations that involve magnetic charge, as well as in other applications where flux is the more appropriate term. Current ideas concerning magnetic potential, or magnetic force, are in a state of confusion. Questions as to the relation between electric potential and magnetic potential, the difference, if any, between potential and force, and the meaning of the distinctions that are drawn between various magnetic quantities such as magnetic potential, magnetic vector potential, magnetic scalar potential, and magnetomotive force, have never received definitive answers. Now, however, by analyzing these quantities into their space-time dimensions we are able to provide the answers that have been lacking. We find that force and potential have the same dimensions, and are therefore equivalent quantities. The term "potential" is generally applied to a distributed force, a force field, and the use of a special name in this context is probably justified, but is should be kept in mind that a potential is a force.

On the other hand, a magnetic potential (force) is not dimensionally equivalent to an electrical potential (force), as it is subject to the additional t/s factor that relates the two-dimensional magnetic quantities to the one-dimensional electric quantities. From the dimensions t/s^2 of the electric potential, if follows that the correct dimensions of the magnetic potential are $t/s \times t/s^2 = t^2/s^3$. This agrees with the dimensions of *magnetic vector potential*. In the SI system, the unit of this quantity is the weber per meter, or $t^2/s^2 \times 1/s = t^2/s^3$. The corresponding cgs unit is the gilbert, which also reduces to t^2/s^3. The same dimensions should apply to *magnetomotive force* (MMF), and to *magnetic potential* where this quantity is distinguished from vector potential. But an error has been introduced into the dimensions attributed to these quantities because the accepted defining relation is an empirical expression that is dimensionally incomplete. Experiments show that the magnetomotive force can be calculated by means of the expression $MMF = nI$, where n is the number of turns in a coil. Since n is dimensionless, this equation indicates that MMF has the dimensions of electric current.

The unit has therefore been taken as the ampere, dimensions s/t. From the discrepancy between these and the correct dimensions we can deduce that the equation $MMF = nI$, from which the ampere unit is derived, is lacking a quantity with the dimensions $t^2/s^3 \times t/s = t^3/s^4$.

There is enough information available to make it evident that the missing factor with these dimensions is the permeability, the magnetic analog of electrical resistance. The permeability of most substances is unity, and omitting has no effect on the numerical results of most experimental measurements. This has led to overlooking it in such

relations as the one used in deriving the ampere unit for MMF. When we put the permeability (symbol μ) into the empirical equation it becomes MMF = μnI, with the correct dimensions, $t^3/s^4 \times s/t = t^2/s^3$. The error in the dimensions attributed to MMF carries over into the potential gradient, the *magnetic field intensity*. By definition, this is the magnetic field potential divided by distance, $t^2/s^3 \times 1/s = t^2/s^4$. But the unit in the SI system is the ampere per meter, the dimensions of which are $s/t \times 1/s = 1/t$. In this case, the cgs unit, the oersted, is derived from the dimensionally correct unit of magnetic potential, and therefore has the correct dimensions, t^2/s^4.

The discrepancies in the dimensions of MMF and magnetic field intensity are typical of the confusion that exists in a number of magnetic areas. Much progress has been made toward clarifying these situations in the past few decades, both active, and sometimes acrimonious, controversies still persist with respect to such quantities as magnetic moment and the two vectors usually designated by the letters B and H. In most of these cases, including those specifically mentioned, introduction of the permeability where it is appropriate, or removing it where it is inappropriate, is all that is necessary to clear up the confusion and attain dimensional validity.

Correction of the errors in electric and magnetic theory that have been discussed in the foregoing paragraphs, together with clarification of physical relations in other areas of confusion, enables expressing all electric and magnetic quantities and relations in terms of space and time, thus completing the consolidation of all of the various systems of measurement into one comprehensive and consistent system. An achievement of this kind is, of course, self-verifying, as the possibility that there might be more than one consistent system of dimensional assignments that agree with observations over the entire field of physical activity is negligible.

But straightening out the system of measurement is only a small part of what has been accomplished in this development. More importantly, the positive identification of the space-time dimensions of any physical quantity defines the *basic physical nature* of that quantity. Consequently, any hypothesis with respect to a physical process in which this quantity participates must agree with the dimensional definition. The effect of this constraint on theory construction is illustrated by the findings with respect to the nature of current electricity that were mentioned earlier. Present-day theory views the electric current as a flow of electric charges. But the dimensional analysis shows that charge has the dimensions t/s, whereas the moving entity in the current flow has the dimensions of space, s. It follows that the current is *not* a flow of electric charges.

Furthermore, the identification of the space-time dimensions of the moving entity not only tells us what the current is not, but goes on to reveal just what it *is*. According to present-day theory, the carriers of the charges, which are identified as electrons, move through the spaces between the atoms. The finding that the moving entities have the dimensions of space makes this kind of a flow pattern impossible. An entity with the dimensions of space cannot move through space, as the relation of space to space is not motion. Such an entity must move *through the matter itself*, not through the vacant spaces. This explains why the current is confined within the conductor, even if the conductor is bare. If the carriers of the current were able to move forward through vacant spaces between atoms, they should likewise be able to move laterally through similar spaces, and escape from the conductor. But since the current moves through the matter, the confinement is a necessary consequence.

The electric current is a *movement of space through matter*, a motion that is equivalent, in all but direction, to movement of matter through space. This is a concept that many individuals will find hard to accept. But is should be realized that the moving entities are not quantities of the space with which we are familiar, extension space, we may call it. There are physical quantities that are dimensionally equivalent to this space of our ordinary experience, and play the same role in physical activity. One of them, capacitance, has already been mentioned in the preceding discussion. The moving entities are quantities of this kind, not quantities of extension space.

Here, then, is the explanation of the fact that the basic quantities and relations of the electric current phenomena are identical with those of the mechanical system. The movement of space through matter is essentially equivalent to the movement of matter through space, and is described by the same mathematical expressions. Additionally, the identification of the electric charge as a motion explains the association between charges and certain current phenomena that has been accepted as evidence in favor of the "moving charge" theory of the electric current. One observation that has had considerable influence on scientific thought is that an electron moving in open space has the same magnetic properties as an electric current. But we can now see that the observed electron is not merely

a charge. It is a particle with an added motion that constitutes the charge. The carrier of the electric current is the same particle *without the charge*. A charge that is stationary in the reference system has electrostatic properties. An uncharged electron in motion within a conductor has magnetic properties. A charged electron moving in a conductor or in a gravitational field has both magnetic and electrostatic properties. It is the motion of physical entities with the dimensions of space that produces the magnetic effect. Whether or not these entities—electrons or their equivalent—are charged is irrelevant from this standpoint.

Another observed phenomenon that has contributed to the acceptance of the "moving charge" theory is the emission of charged electrons from current-carrying conductors under certain conditions. The argument in this instance is that if charged electrons come *out of* a conductor there must have been charged electrons *in* the conductor. The answer to this is that the kind of motion which constitutes the charge is easily imparted to a particle or atom (as anyone who handles one of the modern synthetic fabrics can testify), and this motion is imparted to the electrons in the process of ejection from the conductor. Since the uncharged particle cannot move through space, the acquisition of a charge is one of the requirements for escape.

[Note: the "charged electron" is "charge × electron" = t/s × s = t. When an electron acquires a charge, it appears as "t" (matter), *not space*. Since the relationship of matter to matter does not constitute motion, the electron can no longer move *through* the atoms, but only through the *space* between them. Due to thermal motion and microfractures in conductors, there is sufficient space for these charged electrons to repel each other, and make their way to the surface of the conductor. Hence, current (uncharged electrons) is proportional to the cross sectional area, and "static electricity" (charged electrons), is proportional to the circumference of the conductor. Also, since air is composed of matter which will prevent the escape of charged electrons from the conductor, the most efficient condition for charged electrons to escape is a vacuum—the basis for the filament of a vacuum tube. —*B. M. Peret*]

In addition to providing these alternative explanations for aspects of the electric current phenomena that are consistent with the "moving charge" theory, the new theory of the current that emerges from the scalar motion study also accounts for a number of features of the current flow that are difficult to reconcile with the conventional theory. But the validity of the new theory does not rest on a summation of its accomplishments. The conclusive point is that the identification of the electric current as a motion of space through matter is confirmed by agreement with the dimensions of the participating entities, dimensions that are verified by every physical relation in which the electric current is involved.

The proof of validity can be carried even farther. It is possible to put the whole development of thought in this and the preceding article to a conclusive test. We have found that mass is a three-dimensional scalar motion, and that electric current is a one-dimensional scalar motion through a mass by entities that have the dimensions of space. We have further found that magnetism is a two-dimensional analog of electricity. If these findings are valid, certain consequences necessarily follow that are extremely difficult, perhaps impossible, to explain in any other way. The one-dimensional, oppositely directed flow of the current through the three-dimensional scalar motion of matter neutralizes a portion of the motion in one of the three dimensions, and should leave an observable two-dimensional (magnetic) residue. Similarly, movement of a two-dimensional (magnetic) entity through a mass, or the equivalent of such a motion, should leave a one-dimensional (electric) residue. Inasmuch as these are direct and specific requirements of the theory outlined in the foregoing paragraphs, and are not called for by any other physical theory, their presence or absence is a definitive test of the validity of the theory.

The observations give us an unequivocal answer. The current flow produces a magnetic effect, and this effect is perpendicular to the direction of the current, just as it must be if it is the residue of a three-dimensional motion that remains after motion in the one dimension of the current flow is neutralized. This perpendicular direction of the magnetic effect of the current is a total mystery to present-day physical science, which has no explanation for either the origin of the effect or its direction. But both the origin and the direction are obvious and necessary consequences of our findings with respect to the nature of mass and the electric current.

There is no independent magnetic particle similar to the carrier of the electric current, and no two-dimensional motion of space through matter analogous to the one-dimensional motion of the current is possible, but the same effect can be produced by mechanical movement of mass through a magnetic field, or an equivalent process. As the theory requires, the one-dimensional residue of such

motion is observed to be an electric current. This process is *electromagnetic induction.* The magnetic effect of the current is *electromagnetism.*

On first consideration it might seem that the magnitude of the electromagnetic effect is far out of proportion to the amount of gravitational motion that is neutralized by the current. However, this is a result of the large numerical constant, 3^{10} in cgs units (represented by the symbol "c"), that applies to the space-time ratio s/t where conversion from an n-dimensional quantity to an m-dimensional quantity takes place. An example that, by this time is familiar to all, $E=mc^2$, is the conversion of mass (t^3/s^3) to energy (t/s). In that process, where the relation is between a three-dimensional quantity and a one-dimensional quantity, the numerical factor is c^2. In the relation between the three-dimensional mass and the two-dimensional magnetic residue the numerical factor is c, less than c^2 but still a very large number.

Thus, the theory of the electric current developed in the foregoing discussion passes the test of validity in a definite and positive manner. The results that it requires are in full agreement with two observed physical phenomena of a significant nature *that are wholly unexplained* in present-day physical thought. Together with the positively established validity of the corresponding system of space-time dimensions, this test provides a verification of the entire theoretical development described in this article, a proof that meets the most rigid scientific standard.

MINUTES of the Twenty Second Annual Meeting of the Members of the INTERNATIONAL SOCIETY of UNIFIED SCIENCE

President Hoyt A. Stearns formally opened the meeting 8:30 A.M. August 2, 1997, in the conference room of the home of J. A. McCarty and C. Rueckert, 1504 Hobbs Park Road, Anchorage, Kentucky, USA.

Members Present

Larry Denslow
Laura Jean Fremauw
Russell Kramer
James McCarty
Frank H. Meyer
Frank V. Meyer
Bruce Peret
Carla Rueckert
Robert Staehling
Hoyt Stearns
Tobey Wheelock

Reports

Motion by Frank Meyer to dispense with the reading of the minutes of last year's meeting due to prior publication of the minutes, second by L. J. Fremauw, passed unanimously.

Treasurer's Report

Total, as of July 30, 1997, $5,422.10.
Liability for royalties on D.B.L. books to Mrs. Larson due in December, estimate undetermined. Motion to accept Treasurer's Report as given; seconded; passed unanimously.

Editor's Report

Total expenditures for the year $930. Reciprocity account balance of $540 is insufficient to publish more than one more issue due to increases in reproduction costs. 168 copies of "Beyond Space and Time" purchased by Frank Meyer to be disbursed by Rainer Huck as an ISUS available book. Frank is to be reimbursed for this expenditure. As of June 1997 Frank Meyer completed his term as the editor of Reciprocity, the life blood of ISUS. Bruce Peret was elected to the post of Editor of Reciprocity later in this meeting.

Secretary's Report

Minutes approved as published. Polling of members of the Board as requested obtained approval for Anchorage, KY. Business Cards vs. Membership Cards discussion resolved, new membership cards to be available ASAP. Dewey B. Larson's tape "The Structure of Scientific Revolution," from the University of Wisconsin lecture is available for $8.00.

President's Report

Political intrigue persists regarding status of a certain member who has resigned. Other material discussed that had little to do with ISUS.

Elections
Board Members and Officers

Members serving present term of office ending 1997; Larry Denslow, Rainer Huck, William Mitchell, and Hoyt Stearns; all re-elected to term ending 2000. Jennifer Hafer nominated to and elected unanimously to Board of Directors of ISUS, term to end 2000. Ron Blackburn, Dave Halprin, Tom Kirk, Ed Navarro, Bruce Peret are presently serving term ending 1998. Frank Meyer, K.V.K. Nehru, Phillip Porter, Jan Sammer, and Robin Simms have term ending 1999.

General meeting declared ended to proceed directly into Board of Directors meeting

Hoyt Sterns nominated to continue as President, seconded, elected unanimously. Frank Meyer nominated for Vice-Presidency, seconded, elected unanimously. Jennifer Hafer nominated for the position of Treasurer, seconded, elected unanimously. Larry Denslow nominated to continue as Secretary, seconded, elected unanimously. Rainer Huck nominated to continue as Executive Secretary, seconded, elected unanimously.

Bruce Peret nominated to the position of Editor of Reciprocity, seconded, elected unanimously. K.V.K.Nehru nominated to continue as an Associate Editor, seconded, elected unanimously. Frank Meyer nominated to the position of Assistant Editor, seconded, elected unanimously. Russell Kramer and Tobey Wheelock nominated to positions as an Associate Editors, seconded, elected unanimously.

Business of the Society

Discussion of issues dealing with the Journal, Reciprocity. The format of the journal and its contents were discussed and it was decided that the new format be accepted, as proposed by the editorial staff.

The question of granting life memberships to K. V. K. Nehru, Jan Sammer, and Bruce Peret was discussed and approved unanimously.

Membership rate structure was briefly discussed followed by unanimous approval for increasing membership dues to $35 for outside North American continent to assist in covering increased production costs as well as additional mailing costs.

Remastering of back issues of Reciprocity has been completed and is now available thru normal ISUS publication channels. In addition to life membership for some of those involved, normal overseas membership is extended by two years for David Halprin.

Discussion of price structure of books and tapes; results to appear as the prices in the new price list of available supplies and publications.

The position of "Executive Researcher" was dropped since the person holding that position has resigned from membership in ISUS.

Agreement that "The Structure of the Physical Universe", the original 1959 publication of the Reciprocal System of theory, be made available by listing with the other materials available thru ISUS. Revision and/or corrections committee to be chaired by L. E. Denslow. No publication date established for revision.

Discussion of internet web site donated by lifetime member Mike Wells. Approval to put books, articles, and previously published ISUS materials on line at this site: www.randomc.com/~rs/.

By-Laws revision committee established to be chaired by L.E.Denslow. Russell Kramer, Laura Jean Fremauw and other volunteers to assist as needed.

Discussion of and unanimous approval of a 10% discount on catalog materials to be granted to all current members.

Review and error correction committee for "Basic Properties of Matter" to prepare corrigenda prior to re-printing. All readers are requested to send appropriate corrections to the Secretary and/or Editor.

Preparation of all inclusive index for Reciprocity is in preparation. Missing author information is particularly important.

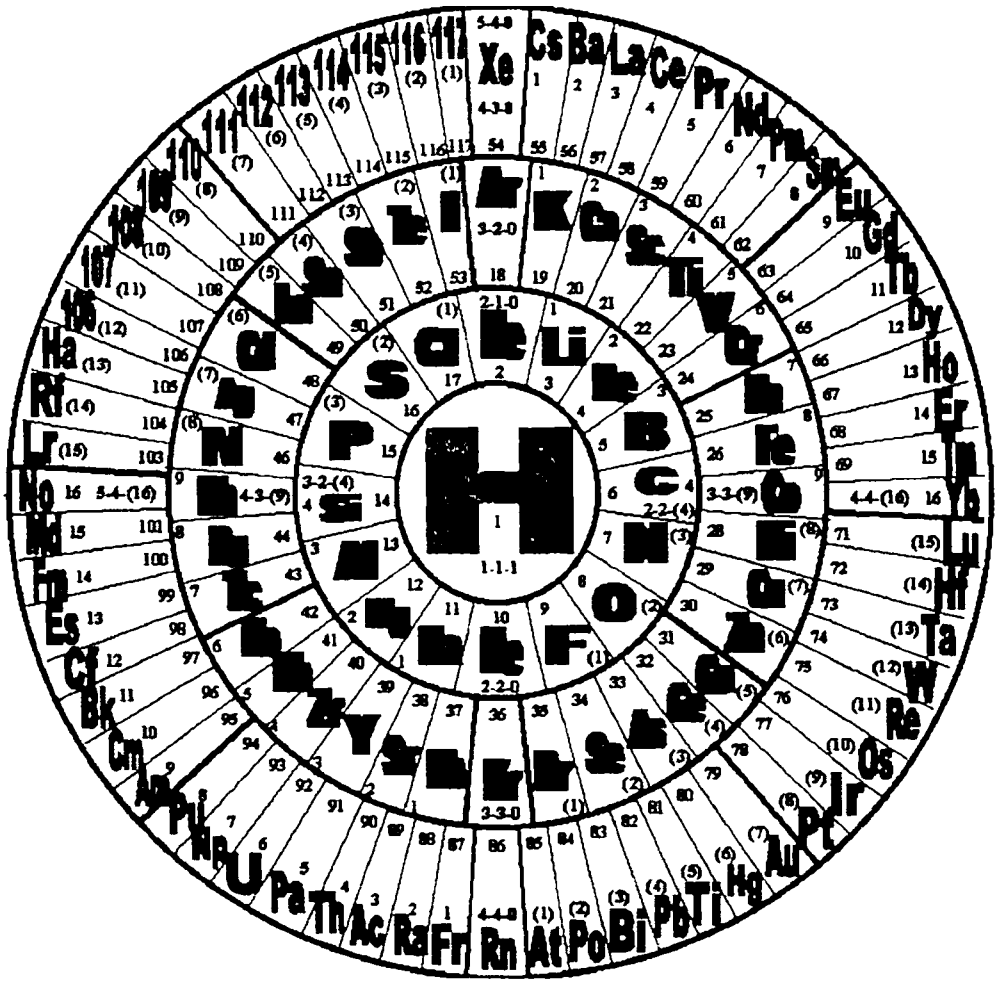
Discussion of how to finance K. V. K. Nehru's lecture tour. No resolution.

Discussion of when to have the annual meeting; i.e., should the meeting of members be annual or biennial? Motion for location of meeting to be in Florida. Motion for specific location followed by extensive discussion; no resolution. Motion for 1998 meeting to be in Florida passed unanimously; during the period between mid-October to mid November preferably over a weekend. Other subsidiary motions died for lack of seconds

Wheel of Motion

A New Periodic Table for the Reciprocal System

Douglas L. Bundy



For many, Dewey Larson's Reciprocal System theory is so superior to modern physical theory that it represents no less than a new gateway to reality. Out of the fog of long tradition, emerges this refreshing, stimulating clarity that beckons us to the future, a future of immense new possibilities fashioned entirely from the combinations of motion.

The wheel is a more natural way to represent the "periodic" nature of the progression of physical elements than a table as can readily be seen from a cursory glance at it. Beginning at the center, the completion of each successive circle represents an addition of a magnetic unit of motion in each of two dimensions.

As devised by Mr. Larson, the three position notation, appearing at the 0 and 180 degree points of each circle, shows the values of the two magnetic dimensions in the first two positions on the left. The third position represents the value of an element's electrical displacement. To determine the configuration of the motion for a particular element, append its value of electrical displacement to the two values of magnetic motion shown for the element at the top of the circle in which the element appears. For example, iron, Fe, would have the value 3-2-8, the values of magnetic motion shown for argon (3-2) plus the electrical value shown for iron (8).

Proceeding clockwise at the 0 degree point and adding motion, in increments of electrical displacement, to an element's existing value of

motion, produces the successive elements of atomic numbers until the 180 degree position of the circle is reached. At this point, the magnetic equivalent of electrical displacements is fulfilled and the notation again shows 0 electrical units with the appropriate magnetic dimension incremented. Thus, the notation always shows a 0 value for electrical displacement at the 12 o'clock and 6 o'clock positions of each circle.

The same notation again appears at the 3 o'clock and 9 o'clock positions. This is to accommodate the observation of Mr. Larson that units of motion follow laws of probability and do not form combinations that are highly unsymmetrical and thus unlikely. Therefore, the element carbon, at the 3 o'clock position in circle 2 for example, is just as likely to take an alternate, but equivalent, form of its motion combination.

This alternate combination of motion is formed by incrementing the motion in a magnetic dimension to its full value at this point, but then compensating for it by adding an equivalent value of electrical displacement in time (indicated by placing parenthesis around the value). Since, in the RS theory, time is the inverse of space, this effectively balances the combination of motion by bringing the total back to the value represented by the original notation. In other words, 2-2-(4) = 2-1-4 for carbon.

As the series progresses, the alternate form of motion combination becomes more likely. Therefore, in each circle, at the 3 o'clock and 9 o'clock positions, the notation switches to the alternate form and the electrical displacement value of each element is shown as units of time displacement descending to zero at the 6 o'clock and 12 o'clock positions.

Successive units of magnetic displacement have an increased value of equivalent electrical displacement by virtue of the nature of the motion itself. Since magnetic motion is actually comprised of two 2 dimensional motions (the first two dimensional motion can be conceived as forming a disk and the second as a rotation of the disk), the equivalent 1 dimensional electrical motion (displacement) of any magnetic motion is two times the value of the magnetic motion squared.

But atoms, according to the RS theory, are actually double units of magnetic motion joined together (as indicated in positions 1 & 2 of the notation). Therefore, the number of total electrical displacements in a circle, and thus the total number of element positions available in a circle, is **twice** the electrical equivalent of the magnetic motion that produces the unit of speed displacement at that point in the progression. So, the first unit (1st circle) has twice 2 times 1 squared or four positions. However, in the first circle, only the fourth position, hydrogen, is represented. The first three positions are not shown, but if they were shown, position one would have the value 1-0-0, position two, 1-0-1, and position three, 1-1-0.

The total electrical displacement value of the second unit (2nd circle), starting with helium, is 2 times 2 squared or 8 electrical units in each of the **two** magnetic motion combinations, for a total of 16. The value of the third unit (3rd circle), starting with argon, is 2 times 3 squared or 18 units of equivalent electrical motion in each magnetic motion combination, for a total of 36. The value of the fourth unit, starting with xenon, is 2 times 4 squared or 32 units of equivalent electrical motion in each of the two magnetic motion combinations, for a total of 64.

So, starting with element number 1, hydrogen, we add one electrical displacement to its value of 1-1-1 which produces helium, 2-1-0 and then proceed around the circle as previously described.

"If the American people ever allow private banks to control the issue of their currency, first by inflation and then by deflation, the banks and the corporations that will grow up around them will deprive the people of all property until their children wake up homeless on the continent their fathers conquered."

—Thomas Jefferson

"We must take away from this the stigma of private enterprise. We must convince the people that it is a governmental agency. We must call it the *Federal Reserve System.* Then everybody will think that it is a government organization and that it is constitutional. But actually it will be in the control of the bankers for their own private benefits."

—Paul M. Warburg, first chairman of the *Federal Reserve*

Basic Properties of Matter

Chapter II: Inter-atomic Distances

Dewey B. Larson

As equation 1-10 indicates, the distance between any two atoms in a solid aggregate is a function of the specific rotations of the atoms. Since each atom is capable of assuming any one of several different relative orientations of its rotational motions, it follows that there are a number of possible specific rotations for each combination of atoms. This number of possible alternatives is still further increased by two additional factors that were discussed earlier. The atom has the option, as we noted in Chapter 10, Volume I, of rotating with the normal magnetic displacement and a positive electric displacement, or with the next higher magnetic displacement and a negative electric increment. And in either case, the effective quantity, the specific rotation, may be modified by extension of the motion to a second vibrating unit, as brought out in Chapter 1.

It is possible that each of these many variations of the magnitude of the specific rotation, and the corresponding values of the inter-atomic distances, may actually be realized under appropriate conditions, but in any particular set of circumstances certain combinations of rotations are more probable than the others, and in ordinary practice the number of different values of the distance between the same two atoms is relatively small, except in certain special cases. As matters now stand, therefore, we are able to calculate from theoretical premises a small set of possible inter-atomic distances for each element or compound.

Ultimately it will no doubt be advisable to evaluate the probability relations in detail so that the results of the calculations will be as specific as possible, but it has not been feasible to undertake this full treatment of the probability relationships in this present work. In an investigation of so large a field as the structure of the physical universe there must not only be some selection of the subjects that are to be covered, but also some decisions as to the extent to which that coverage will be carried. A comprehensive treatment of the probability relations wherever they enter into physical situations could be quite helpful, but the amount of time and effort required to carry out such a project will undoubtedly be enormous, and its contribution to the major objectives of this present undertaking is not sufficient to justify allocating so much of the available resources to it. Similar decisions as to how far to carry the investigation in certain areas have had to be made from time to time throughout the course of the work in order to limit it to a finite size.

It might be well to point out in this connection that it will never be possible to calculate a unique inter-atomic distance for every element or combination of elements, even when the probability relations have been definitely established, as in many cases the choice from among the alternatives is not only a matter of relative probability, but also of the history of the particular specimen. Where two or more alternative forms are stable within the range of physical conditions under which the empirical examination is being made; the treatment to which the specimen has previously been subjected plays an important part in the determination of the structure.

It does not follow, however, that we are totally precluded from arriving at definite values for the inter-atomic distances. Even though no quantitative evaluation of the relative probabilities of the various alternatives is yet available, the nature of the major factors involved in their determination can be deduced theoretically, and this qualitative information is sufficient in most cases to exclude all but a very few of the total number of possible variations of the specific rotations. Further-more, there are some series relations by means of which the range of variability can be still further narrowed. These series patterns will be more evident when we examine the distances in compounds in the next chapter, and they will be given more detailed consideration at that point.

The first thing that needs to be emphasized as we begin our analysis of the factors that determine the inter-atomic distance is that we are not dealing with the *sizes* of atoms; what we are undertaking to do is to evaluate the distance between the *equilibrium positions* that the atoms occupy under specified conditions. In Chapter 1 we examined the general nature of the atomic equilibrium. In this and the following chapter we will see how the various factors involved in the relations between the

rotations of the (apparently) interacting atoms affect the point of equilibrium, and we will arrive at values of the inter-atomic distances under static conditions. Then in Chapters 5 and 6 we will develop the quantitative relations that will enable us to determine just what changes take place in these equilibrium distances when external forces in the form of pressure and temperature are applied.

As we have seen in the preceding volume, all atoms and aggregates of matter are subject to two opposing forces of a general nature: gravitation and the progression of the natural reference system. These are the primary forces (or motions) that determine the course of physical events. Outside the gravitational limits of the largest aggregates, the outward motion due to the progression of the natural reference system exceeds the inward motion of gravitation, and these aggregates, the major galaxies, move outward from each other at speeds increasing with distance. Inside the gravitational limits the gravitational motion is the greater, and all atoms and aggregates move inward. Ultimately, if nothing intervenes, this inward motion carries each atom within unit distance of another, and the directional reversal that takes place at the unit boundary then results in the establishment of an equilibrium between the motions of the two atoms. The inter-atomic distance is the distance between the atomic centers in this equilibrium condition. It is not, as currently assumed, an indication of the sizes of the atoms.

The current theory which regards the interatomic distance as a measure of "size" is, in many respects, quite similar to the electronic "bond" theory of molecular structure. Like the electronic theory, it is based on an erroneous assumption—in this case, the assumption that the atoms are in contact in the solid state—and like the electronic theory, it fits only a relatively small number of substances in its simple form, so that it is necessary to call upon a profusion of supplementary and subsidiary hypotheses to explain the deviations of the observed distances from what are presumed to be the primary values. As the textbooks point out, even in the metals, which are the simplest structures from the standpoint of the theory, there are many difficult problems, including the awkward fact that the presumed "size" is variable, depending on the nature of the crystal structure. Some further aspects of this situation will be considered in Chapter 3.

The resemblance between these two erroneous theories is not confined to the lack of adequate foundations and to the nature of the difficulties that they encounter. It also extends to the resolution of these difficulties, as the same principles that were derived from the postulates of the Reciprocal System to account for the formation of molecules of chemical compounds, when applied in a somewhat different way, are the general considerations that govern the magnitude of the inter-atomic distance in both elements and compounds. Indeed, all aggregates of electronegative elements are molecular in their composition, rather than atomic, as the molecular requirement that the negative electric displacement of an atom of such an element must be counterbalanced by an equivalent positive displacement in order to arrive at a stable equilibrium in space applies with equal force to a combination with a like atom. As we saw in our examination of the structural situation, electropositive elements are not subject to this restriction, but in many cases the molecular (balanced orientation) type of structure takes precedence over the electropositive structure by reason of collateral factors that affect the relative probability. Because of this fact that the distances follow the structural pattern, the various ways of orienting the atomic rotations that were discussed in Chapter 18, Volume I, with a few modifications due to the special conditions that exist in the elemental aggregates, determine the manner in which the atoms of an element are able to combine with each other, and the effective values of the specific rotations in these combinations.

In the electropositive elements the specific rotations are based, in the first instance, on the rotational displacements as listed in Chapter 10, Volume I. Where the inter-atomic orientation is the normal positive arrangement, the displacements as listed are translated directly into specific rotations by addition of the initial unit and reduction of the incremental values where the rotation extends to vibration two. Except for the elements of group 2A, which, as already noted, are subject to some special considerations because of their low magnetic displacements, the elements of Division I all follow the regular electropositive pattern of specific rotations. The only irregularities are in the electric rotations of the second and third elements of each group, where the point of transition to vibration two varies between groups. The inter-atomic distances in this division are listed in Table 2.

The regular electropositive pattern is also applicable in Division II, and a number of the Division II elements of Group 3A crystallize on this basis, with inter-atomic distances determined in the same manner as in Division I. As noted in Volume I, however, the Division II elements generally favor the magnetic type of orientation in chemical

compounds because the normal positive orientation becomes less probable as the displacement, increases. The same probability considerations operate against the positive orientation in the elements of this division, but instead of employing the magnetic orientation as the alternate, these elements utilize a type of orientation that is available only where all rotations of each participant in a combination are identical with those of the other. This arrangement reverses the effective directions of the rotations of alternate atoms. The resulting relative rotation is a combination of x and $8\text{-}x$ (or $4\text{-}x$), as in the neutral orientation, and the effective specific rotations are 10 for vibration one and 5 for vibration two. A combination value 5-10 is also common.

Table 2: Distances - Division I

Group	Atomic Number	Name	Specific Rotation Magnetic	Specific Rotation Electric	Distance Calculated	Distance Observed
2B	11	Sodium	3-2½			
			3-3	2	3.70	3.71
	12	Magnesium	3-2½	2½	3.17	3.21
	13	Aluminum	3-2½	3	2.83	2.86
3A	19	Potassium	4-3	2	4.49	4.50
	20	Calcium	4-3	2½	4.00	3.98
	21	Scandium	4-3	4	3.18	3.20
	22	Titanium	4-3	5	2.95	2.92
3B	37	Rubidium	4-4	2	4.85	4.87
	38	Strontium	4-4	2½	4.32	4.28
	39	Yttrium	4-4	3½	3.64	3.63
	40	Zirconium	4-4	5	3.18	3.23
4A	55	Cesium	4½-4½	2	5.23	5.24
	56	Barium	5-4½	3	4.36	4.34
	57	Lanthanum	4½-4½	4	3.70	3.74
	58	Cerium	5-4½	5	3.61	3.63
4B	89	Actinium	4½-5	4	3.79	3.76*
	90	Thorium	4½-5	5	3.52	3.56

This reverse type of structure makes its appearance in body-centered cubic crystal forms of Chromium and Iron, which coexist with the regular positive hexagonal or face-centered cubic structures. Vanadium and Niobium, the first Division II elements of their respective groups, combine the positive and reverse orientations. Beyond Niobium the positive orientation does not appear in the common Division II forms of the elements, the structures to which the present discussion is limited, and all elements take the reverse orientation, except Europium and Ytterbium, which combine it with a unit-specific rotation; that is, no electric-rotational displacement at all, as in the inert gas elements.

On the basis of the considerations discussed in Chapter 1, the average effective specific rotation for such rotational combinations has been taken as the geometric mean of the two components. Where the orientations are the same, and the only difference is in the magnitude, as in the 5-10 combination, and in the combinations of magnetic rotations that we will encounter later, the equilibrium is reached in the normal manner. If two different electric rotations are involved, the two-atom pairs cannot attain spatial equilibrium individually, but they establish a group equilibrium similar to that which is achieved where n atoms of valence one each combine with one atom of valence n.

The Division II distances are shown in Table 3.

Because of the greater probability of the electropositive types of combinations, the characteristics of Division II carry over into the first elements of Division III, and these elements, Nickel, Palladium, and Lutetium, are included in the table. Some similar modifications of the normal division boundaries have already been noted in connection with other subjects.

Table 3: Distances - Division II

Group	Atomic Number	Name	Specific Rotation Magnetic	Electric	Distance Calculated	Observed
3A	23	Vanadium	4-3	6-10	2.62	2.62
	24	Chromium	4-3	7	2.68	2.72
			4-3	10	2.46	2.49
	25	Manganese	4-3	8	2.59	2.58
	26	Iron	4-3	8½	2.56	2.57
			4-3	10	2.46	2.48
	27	Cobalt	4-3	9	2.52	2.51
	28	Nickel	4-3	9½	2.49	2.49
3B	41	Niobium	4-4	6-10	2.83	2.85
	42	Molybdenum	4-4½	10	2.72	2.72
	43	Technetium	4-4½	10	2.73	2.73*
	44	Ruthenium	4-4½	10	2.73	2.70
	45	Rhodium	4-4	10	2.66	2.69
			4-4½	10	2.73	2.76
	46	Palladium	4-4½	10	2.73	2.74
4A	59	Praseodymium	5-4½	5	3.61	3.64
	60	Neodymium	5-4½	5	3.61	3.65
	62	Samarium	5-4½	5	3.61	3.62*
	63	Europium	4½-5	1-5	3.96	3.96
	64	Gadolinium	5-4½	5	3.61	3.62
	65	Terbium	5-4½	5	3.61	3.59
	66	Dysprosium	5-4½	5	3.61	3.58
	67	Holmium	4½-5	5	3.52	3.56
	68	Erbium	4½-5	5	3.52	3.53
	69	Thulium	4½-5	5	3.52	3.52
	70	Ytterbium	4½-4½	1-5	3.86	3.87
	71	Lutetium	4½-5	5	3.52	3.50*
4B	91	Protactinium	4½-5	5-10	3.22	3.24*
	92	Uranium	4½4½	10	2.87	2.85
	93	Neptunium	4½-4½	5	3.43	3.46*
	94	Plutonium	4½4½	5-10	3.14	3.15*
	95	Americium	4½-4½	5	3.43	3.46*
	96	Curium	4½-4½	5-10	3.14	3.10*
	97	Berkelium	4½-4½	5	3.43	3.40*

The net total rotation of the material atom is a motion with positive displacement—that is, a speed less than unity—and as such it normally results in a change of position in space. Inside unit space, however, all motion is in time. The orientation of the atom for the purpose of the space-time equilibrium therefore exists in the three dimensions of time. As we saw in our examination of the inter-regional situation in Chapter 12, Volume I, each of these dimensions contacts the space of the region outside unit distance individually. To the extent that the motion in a dimension of time acts along the line of this contact it is a motion in equivalent space. Otherwise it has no spatial effect beyond the unit boundary. Because of the independence of the three dimensions of motion in time the relative orientation of the electric rotation of any combination of atoms may be the same in all spatial dimensions, or there may be two or three different orientations.

In most of the elements that have been discussed thus far the orientation is the same in all spatial dimensions, and in the exceptions the alternate rotations are symmetrically distributed in the solid structure. The force system of an aggregate of such elements is isotropic. It follows that any aggregate of atoms of these elements has a structure in which the constituents are arranged in one of the Geometrical patterns possible for equal forces: an isometric crystal. All of the electropositive elements (Divisions I and II) crystallize in isometric forms, and, except for a few which apparently have quite complex structures, each of the crystal forms of these elements belongs to one or another of three

types: the face-centered cube, the body-centered cube, or the hexagonal close-packed structure.

We now turn to the other major subdivision of the elements, the electronegative class, those whose normal electric displacement is negative. Here the force system is not necessarily isotropic, since the most probable arrangement in one or two dimensions may be the negative orientation, a direct combination of two negative electric displacements, similar to the all-positive combinations. It is not possible to have negative orientation in all three dimensions, and wherever it does exist in one or two dimensions the rotational forces of the atoms are necessarily anisotropic. The controlling factor is the requirement that the net total rotational displacement of a material atom as a whole must be positive. Negative orientation in all three dimensions is obviously incompatible with this requirement, but if the negative displacement is restricted to one dimension the aggregate has fixed atomic positions in two dimensions, with a fixed average position in the third because of the positive displacement of the atom as a whole. This results in a crystal structure that is essentially equivalent to one with fixed positions in all dimensions. Such crystals are not usually isometric, as the inter-atomic distance in the odd dimension is generally different from that of the other two. Where the distances in all dimensions do happen to coincide, we will find on further investigation that the space symmetry is not an indication of force symmetry.

If the negative displacement is very small, as in the lower division IV elements, it is possible to have negative orientation in two dimensions if the positive displacement in the third dimension exceeds the sum of these two negative components, so that the net result is still positive. Here the relative positions of the atoms are fixed in one dimension only, but the average positions in the other two dimensions are constant by reason of the net positive displacement of the atoms. An aggregate of such atoms retains most of the external characteristics of a crystal, but when the internal structure is examined the atoms appear to be distributed at random, rather than in the orderly arrangement of the crystal. In reality there is just as much order as in the crystalline structure, but part of the order is in time rather than in space. This form of matter can be identified as the glassy, or vitreous, form, to distinguish it from the crystalline form.

The term "state" is frequently used in this connection instead of "form," but the physical state of matter has an altogether different meaning based on other criteria, and it seems advisable to confine the use of this term to the one application. Both glasses and crystals are in the solid state.

In beginning a consideration of the structures of the individual electronegative elements, we will start with Division III. The general situation in this division is similar to that in Division II, but the negativity of the normal electric displacement introduces a new factor into the determination of the orientation pattern, as the most probable orientation of an electronegative element may not be capable of existing in all three dimensions. As stated earlier, where two or more different orientations are possible in a given set of circumstances the relative probability is the deciding factor. Low displacements are more probable than high displacements. Simple orientations are more probable than combinations. Positive electric orientation is more probable than negative. In Division I all of these factors operate in the same direction. The positive orientation is simple, and it also has the lowest displacement value. All structures in this division are therefore formed on the basis of the positive orientation. In Division II the margin of probability is narrow. Here the positive displacement x is greater than the inverse displacement $8\text{-}x$, and this operates against the greater inherent probability of a simple positive structure. As a result, both the positive and reverse types of structure are found in this division, together with a combination of the two.

In Division III the negative orientation has a status somewhat similar to that of the positive orientation in Division II. As a simple orientation, it has a relatively high probability. But it is limited to one dimension. The regular division III structures of Groups 3A and 3B are therefore anisotropic, with the reverse orientation in the other two dimensions. A combination of these two types of orientation is also possible, and in copper and silver, the first Division III elements of their respective groups, the crystals formed on the basis of this combination orientation have cubic symmetry. As in Division II, the elements of Division III in Groups 4A and 4B crystallize entirely on the basis of the reverse orientation. Table 4 lists what may be considered as the regular inter-atomic distances of the elements of Division III.

Although the probability of the negative orientation is greater in Division IV than in Division III, because of the smaller displacement values, this type of structure seldom appears in the crystals of the lower division. The reason is that where this orientation exists in the elements of the lower displacements, it exists in two dimensions, and this

Table 4: Distances - Division III

Group	Atomic Number	Name	Specific Rotation Magnetic	Specific Rotation Electric	Distance Calculated	Distance Observed
3A	29	Copper	4-3	8-10	2.53	2.55
	30	Zinc	4-4	7	2.90	2.91
			4-4	10	2.66	2.66
	31	Gallium	4-3	6	2.79	2.80
			4-3	10	2.46	2.44
3B	47	Silver	4-5	8-10	2.87	2.88
	48	Cadmium	5-4	7	3.20	3.26*
			5-4	10	2.94	2.97
	49	Indium	5-4	6	3.33	3.37
			5-4	6-10	3.21	3.24
4A	72	Hafnium	4-4½	5	3.26	3.32
	73	Tantalum	4½-4½	10	2.87	2.86
	74	Tungsten	4-4½	10	2.73	2.74
	75	Rhenium	4-4½	10	2.73	2.77*
	76	Osmium	4-4½	10	2.73	2.73
	77	Iridium	4-4½	10	2.73	2.71
	78	Platinum	4-4½	10	2.73	2.77
	79	Gold	4½-4½	10	2.87	2.88
	80	Mercury	4-4½	5-10	2.98	3.00
			4½-4½	5	3.43	3.47
	81	Thallium	4½-4½	5	3.43	3.45

produces a glassy or vitreous aggregate rather than a crystal. The reverse orientation is not subject to any restrictive factor of this nature, but it is less probable at the lower displacements, and except in Group 4A, where it continues to predominate, this orientation appears less frequently as the displacement decreases. Where it does exist it is increasingly likely to combine with some other type of orientation. As a result of these limitations that are applicable to the inherently more probable types of orientation, many of the Division IV structures are formed on the basis of the secondary positive orientation, a combination of two 8-x displacements.

The secondary positive orientation is not possible in the electropositive divisions, as 8-x is negative in these divisions, and like the negative orientation itself, an 8-x negative combination would be confined to a subordinate role in one or two dimensions of an asymmetric structure. Such a crystal structure cannot compete with the high probability of the symmetrical electropositive crystals, and therefore does not exist. In the electronegative divisions, however, the 8-x displacement is positive, and there are no limitations on it, aside from those arising from the high displacement values.

The effective displacement of this secondary positive orientation is even greater than might be expected from the magnitude of the quantity 8-x, as the change of zero points for the two oppositely directed motions is also oppositely directed, and the new zero points are 16 displacement units apart. The resultant relative displacement is 16-2x, and the corresponding specific rotation is 18-2x. In Division IV the numerical values of the latter expression range from 10 to 16, and because of the low probability of such high rotations, the secondary positive orientation is limited to one or one and one-half dimensions in spite of its positive character. In Division III the 8-x displacements are lower, but in this case they are too low. A two-unit separation of the zero points (16 displacement units) cannot be maintained unless the effective displacement is at least 8 (one full three-dimensional unit). The secondary positive orientation is therefore confined to Division IV.

A special type of structure is possible only for those electronegative elements which have a rotational displacement of four units in the electric dimension. These elements are on the borderline between Divisions III and IV, where the secondary positive and reverse orientations are about equally probable. Under similar conditions other elements crystallize in hexagonal or tetragonal structures, utilizing the different orientations in the different dimensions. For these displacement 4 elements, however, the two orientations produce the same specific rotation: 10.

Table 5: Distances - Division IV

Group	Atomic Number	Name	Specific Rotation Magnetic	Specific Rotation Electric	Distance Calculated	Distance Observed
2B	14	Silicon	3-3	5-10	2.31	2.35
	15	Phosphorus	3-3	10	2.19	2.2
			3-4			
			3-4	1	3.46	3.48*
	16	Sulfur	3-3	10	2.11	2.07
			3-3	1	3.21	3.27*
	17	Chlorine	3-3	16	1.92	1.82
			3-3	1-16	2.48	2.52
3A	32	Germanium	4-3	10	2.46	2.43
	33	Arsenic	4-3	12	2.37	2.44*
			4-3	10	2.46	2.51
	34	Selenium	4-3	14	2.32	2.32
			3-4	1	3.46	3.46
	35	Bromine	4-3	16	2.25	2.27
			3-4	1	3.46	3.3
3B	50	Tin	4½-4	10	2.8	2.8
			5-4	5-10	3.22	3.17
			5-4	10	2.94	3.02
	51	Antimony	5-4	12	2.83	2.87
			5-4	4-10	3.34	3.36*
	52	Tellurium	5-4½	14	2.82	2.86
			5-4½	1-10	3.71	3.74
	53	Iodine	5-4	16	2.68	2.7
			5-4	1-16	3.54	3.54
			5-4	1	4.46	4.41*
4A	82	Lead	4½-4½	5	3.43	3.49
	83	Bismuth	4½-4½	5	3.43	3.47*
			4½-4½	5-10	3.14	3.1
	84	Polonium	4½-4½	5	3.43	3.40*

The inter-atomic distance in these crystals is therefore the same in all dimensions, and the crystals are isometric, even though the rotational forces in the different dimensions are not of the same character. The molecular arrangement in this crystal pattern, the diamond structure, shows the true nature of the rotational forces. Outwardly this crystal cannot be distinguished from the isotropic cubic crystals, but the analogous body-centered cubic structure has an atom at each corner of the cube as well as one in the center, whereas the diamond structure leaves alternate corners open to accommodate the abnormal projection of forces in the secondary positive dimension.

In those of the lower elements of Division IV that are beyond the range of the inverse type of orientation, there is no available alternative for combination with the secondary positive orientation. The crystals of these elements therefore have no effective electric rotation in the remaining dimensions, and the relative specific rotation in these dimensions is unity, as in all dimensions of the inert gas elements. The most common distances in the aggregates of the Division IV elements are shown in Table 5.

Up to this point, no consideration has been given to the elements of atomic number below 10, as the rotational forces of these elements are subject to certain special influences which make it desirable to discuss them separately. One cause of deviation from the normal behavior is the small size of the rotational groups. In the larger groups the four divisions are distinct, and, except for some overlapping, each has its own characteristic force combinations, as we have seen in the preceding paragraphs. In an 8-element group, however, the second series of four elements, which would normally constitute Division III, is actually in the Division IV position. As a result, these four elements have, to a certain extent, the properties of both divisions. Similarly, the Division I elements of these groups may, in some cases, act as if they were

Table 6: Distances - Lower Group Elements

Group	Atomic Number	Name	Specific Rotation Magnetic	Specific Rotation Electric	Distance Calculated	Distance Observed
1B	1	Hydrogen	3(1)	10	0.70	0.74*
	2	Helium	3(1)	1	1.07	1.09
*2A	3	Lithium	2½-2½	2	3.05	3.03
	4	Beryllium	3(2)	2½	2.282	2.28
	5	Boron	3(2)	5	1.68	1.74*
			3-3	10	2.11	2.03*
	6	C (diamond)	3(2)	5-10	1.54	1.54
		C (graphite)	3(2)	1	1.41	1.42
			3-3	1	3.21	3.40
	7	Nitrogen	3(1½)	10	1.06	1.06
			3-3	1	3.21	3.44*
	8	Oxygen	3(1½)	10	1.06	1.15*
			3-3	1	3.21	3.20*
	9	Fluorine	3(2)	10	1.41	1.44*

members of Division III.

A second influence that affects the forces and the crystal structures of the lower group elements is the inactivity of the rotational forces in certain dimensions that was mentioned earlier. A specific rotation of two units produces no effect in the positive direction. The reason for this is revealed by equation 1-1. By applying this equation we find that the effective rotational force ($\ln t$) for $t = 2$ is 0.693, which is less than the opposing space-time force 1.00. The net effective force of specific rotation 2 is therefore below the minimum value for action in the positive direction. In order to produce an active force the specific rotation must be high enough to make $\ln t$ greater than unity. This is accomplished at rotation 3.

The specific magnetic rotation of the 1B group, which includes only the two elements hydrogen and helium, and the 2A group of eight elements beginning with lithium, combines the values 3 and 2. Where the value 2 applies to the subordinate rotation (3-2), one dimension is inactive; where it applies to the principal rotation (2-3), two dimensions are inactive. This reduces the force exerted by each atom to 2/3 of the normal amount in the case of one inactive dimension, and to 1/3 for two inactive dimensions. The inter-atomic distance is proportional to the square root of the product of the two forces involved. Thus the reduction in distance is also 1/3 per inactive dimension.

Since the electric rotation is not a basic motion, but a reverse rotation of the magnetic rotational system, the limitations to which the basic rotation is subject are not applicable. The electric rotation merely modifies the magnetic rotation, and the low value of the force integral for specific rotation 2 makes itself apparent by an inter-atomic distance which is greater than that which would prevail if there were no electric displacement at all (unit specific rotation).

Theoretical values of the inter-atomic distances of the lower group elements are compared with measured values in Table 6.

The figures in parentheses in column 4 of this table indicate the effective number of dimensions. Thus the notation 3(1) shown for hydrogen means that this element has a specific magnetic rotation of 3, effective in only one dimension.

Except where the crystals are isometric, there is still much uncertainty in the distance measurements on these lower group elements, and many other values have been reported in addition to those included in the table. This situation will be discussed at length in Chapter 3, where we will have the benefit of measurements of the distances between like atoms that are constituents of chemical compounds.

As indicated in the introductory paragraphs of this chapter, we are not yet in a position where we can determine specifically just what the inter-atomic distance will be for any given element under a given set of conditions. The theoretical considerations that have been discussed actually do lead to specific values in many cases, but in other instances there is an uncertainty as to which of two or more theoretically possible rotational arrangements corresponds to the observed crystal structure. Continuing progress is being made in both the

experimental and the theoretical fields, and it can be expected that these uncertainties will gradually diminish toward the irreducible minimum that was mentioned earlier. In the course of this process there will necessarily be some changes in the identifications of the observed inter-atomic distances with the theoretically possible structures. A comparison of Tables 1 to 6 with the corresponding tabulations of the first edition should therefore be of interest as an indication of the nature and magnitude of the changes that have taken place in our view of this interatomic distance situation in the last twenty years, and by extension, an indication of the amount of change that can be expected in the future.

Such a comparison shows that the modifications of the original conclusions that now appear to be required, in the light of the additional information that has been made available, are confined almost entirely to those which have resulted from a better theoretical understanding of the behavior of the specific magnetic rotation above an effective value of 4. Few changes are required in either the magnetic or electric values in those rotational combinations where the specific magnetic rotation is 4-4 or less.

One of the puzzling features of the rotational situation as it appeared at the time of the original publication was the apparent retrograde progression of the specific magnetic rotation in Groups 4A and 4B. It was recognized at that time that both the 4½ and 5 values of the specific rotation correspond to the same displacement, 4, the difference being that in the case of the 4½ value the rotation extends to two units of vibration, and the last increment of specific rotation in this case is only half size. The next half unit increment, if such an increment were possible, would bring the 4½ rotation back to the 5 value. It would therefore appear that the sequence of specific rotations beyond 4½-4 should be 4½-4½, 5-4½, 5-5, and so on. But the tendency is in the opposite direction. Instead of moving toward higher values as the atomic number increases, there is actually a decreasing trend. This was already evident at the time of publication of the first edition, as the low inter-atomic distances of the series of elements from Tungsten to Platinum could not be accounted for unless the specific magnetic rotation dropped back to 4-4½ from the higher levels of the preceding elements of the 4A group. This decreasing trend has become even more prominent as distances have become available for additional elements of Group 4B, as some of these values indicate specific magnetic rotations of 4-4, or possibly even 4-3½.

As it happens, the continuation of the trend toward lower values in the more recent data has had the effect of clarifying the situation. It is now evident that the 5-5 specific rotation is not reached within the accessible portion of Groups 4A and 4B. (Considerations that will be discussed later show that the specific rotation of 5-5 would be unstable.) The lower values in the 4A and 4B groups do not result from a decrease in the magnetic displacement, but from a shift of the existing displacement units from vibration one to vibration two, a process which reduces the specific rotation of the units by one half. On a vibration one basis, rotational displacements 4-3 correspond to specific rotations 5-4. Conversion of successive units of displacement to vibration two, without change in the number of displacement units, results in a series of specific rotations, 5-4, 4½-4, 4-4½, 4-4, and so on. A similar series with one additional displacement unit goes through the values 5-4½, 4½-5, 4½-4½, 4½-4, and then follows the same route as the series with the lower displacement.

The modifications that have been made in the theoretical rotational values applicable to the elements of these two highest rotational groups since the publication of the first edition are the result of a review of the situation in the light of this new understanding of the trend of the specific rotation. The general pattern in group 4A is now seen to be that of the series from 5-4½ to 4-4½, with a return to 4½-4½ in the lower electronegative elements. So far as can be determined at this time, Group 4B follows the same pattern one step farther advanced; that is, it begins with 4½-5 rather than 5-4½.

The difference in the inter-atomic distance corresponding to one of the steps in this conversion process is relatively small, and in view of the substantial variation in the experimental values it has not appeared advisable to take into account the possibility of combinations such as 4½-5 specific rotation of one atom of a pair and 4½-4½ in the other. It seems clear that such combinations do exist in some of the lower group elements, Sodium, for example, and they probably play some part in the higher groups. Most of the reported distances for Holmium and Erbium, for instance, agree more closely with a combination of 5-4½ and 4½-5 than with either individually. However, all of these values are theoretically possible, and the only question at issue in this and many other similar cases is which theoretical value corresponds to the observed distance. Definitive answers to identification questions of this kind will have to wait until the theoretical probabilities are specifically evaluated, or the experimental uncertainties are resolved.

Many questions concerning alternate crystal structures will also have to wait for more information from theory or experiment, particularly where crystal forms that exist only at high temperatures or pressures are involved. There is, however, a large body of information already available in this area, and it can be tied into the theoretical picture as soon as someone has the time and the inclination to undertake the task.

Space-Time Geometry

Dr. Bruce M. Peret

One of the basic premises of the *Reciprocal System* is that of "unity natural datum," the default motion of one unit of space per one unit of time, which we identify scientifically as the speed of light. All of the *Reciprocal System* material *assumes* that this also implies that a single unit of space is connected to a single unit of time, to form that unit of motion.

At the 1996 Denver retreat, I presented a concept which I referred to as "perpendicular time"—the idea that space and time were not "parallel" progressions, but had a 90° phase relationship, as the X and Y axes of a graph do. With further research, what I have found is that both cases are true.

For example, the 1/3 photon in a "parallel" system would be:

in	out	in
out	out	out

whereas the "perpendicular" system would be:

	in	out	in
out	out	out	out

composed of 1/(½+2+½) = 1/3. The problem with this is the loss of the "quantized" aspect of dealing solely with discrete units of motion. (Though Larson does use ½ units quite frequently in *Basic Properties of Matter*).

Referring to Larson's research on inter-atomic distances, one finds that a temporal displacement manifests in space as the *integral* of that displacement (in the case of atoms, the 1/x series integrates into the natural logarithm). The primary motion is the *vibration*, represented by the *cosine* function (the zero-degree reference—the unit boundary—is 1.0, and therefore cosine is more appropriate a representation than sine). Thus, a temporally displaced "vibration" will manifest in space as the integral of the cosine—the *sine wave*.

From this we can theorize that all temporal events are out of phase by 90° from all spatial events, when viewed from the Material Sector.

We can also deduce that the Cosmic Sector, the sector of the universe with 3-dimensional time and clock space, is not far away in another half of the universe, but simply co-exists with the Material Sector, and is "rotated" 90° from our perception.

As the Y axis on a graph can only intersect the X axis at a single point (perpendicular lines are never concurrent), the Cosmic Sector can only intersect the Material at a single point—the scalar magnitude known as "clock time." So we only perceive the 3-dimensionality of the Cosmic Sector moving thru our Material Sector as a net motion, kind of like a background breeze.

Of course, the same holds true for the Cosmic Sector constructs, with the Material Sector passing thru it, 90° out of phase, manifesting as "clock space" in that half of the universe.

In summary, though motion is composed of discrete units, linked one-on-one, one aspect will always appear 90° out of phase with the other, when viewed from either the Material or Cosmic Sectors.

> "The immaterial is known by means of scientific thought, the Material by scientific perception."
>
> —Speusippus

Understanding the Reciprocal System Lesson II

Postulates of the Reciprocal System of Theory and some Initial Consequences

Lawrence E. Denslow

The basic postulates of the Reciprocal System of Theory from which a complete theoretical physical Universe of Motion has been developed are:

1. The physical universe is composed entirely of one component, motion, existing in three dimensions, in discrete units, and in two reciprocal forms [aspects], space and time.

As implied in this postulate motion is defined as the relation between two uniformly progressing reciprocal quantities, space and time. According to this postulate neither space nor time has separate existence apart from the concept of motion in which each is the conceptual reciprocal of the other. Even though WE cannot perceive motion without something moving, the concept of motion is not dependent upon the presence of matter for its definition and use.

2. The physical universe conforms to the relations of ordinary commutative mathematics, its primary magnitudes are absolute, and its geometry is Euclidean.

Space and time are the reciprocal aspects of each other, existing together and only in the relation that is "motion". Complete reciprocity of the two aspects requires that time be three dimensional just like space. The dimensions of time must have temporal relationship to each other in exactly the same way spatial dimensions are related in space. The dimensions OF time are dimensions IN time, NOT in space. The dimensions OF space are dimensions IN space. The characteristics of each are merely the reciprocals of those of the other.

The three principal characteristics of unitary motion are:

(1) *All motion progresses with respect to reference positions in individual reference systems in which those units of motion exist and are represented.* Motion cannot be represented without the use of some kind of reference and it is obvious that many references can exist simultaneously.

All units of primary motion progress in an outward or positive direction from positions of reference and all units of displacement motion progress inward or negatively with respect to reference positions in the individual dimensional reference systems.

(2) *Motion is continuous and continuity exists between contiguous units of motion as well as within individual units of motion.*

Each identifiable "thing" in the physical universe whether thought of as an atom, sub-atomic particle, or an individual photon exists at an identifiable reference point in a generalized coordinate system of space. Each "thing" is composed of units of motion. Each "thing" is a reference point from which the outward progression of primary motion exists; i.e., both primary space and primary time progress outward from each and every reference point or is observed by the movement of certain reference points with respect to other reference points. Measurements of the quantities normally referred to as space and time are part and parcel, the essential expressions of, the natural progression of primary motion originating at each and every reference point in a generalization of space and in a generalization of time. There is no absolute space in the sense previously argued in scientific circles; neither the space nor the time of observation is an arbitrary immovable construct in which something can be placed or located. Continuity of progression is one of the principal characteristics of primary motion and absolute magnitude is another.

(3) *Primary motion causes no change of location in the natural reference system.*

Primary motion is an everpresent outwardly progressing reference from which displacements from uniform outward progression can be

recognized as something and be evaluated. Locations in the natural reference system cannot change with respect to each other. Existence of a unit of primary motion represented in a dimensional system for the purpose of supporting displacement units of motion must not cause any change in the location of that unit of primary motion in the natural reference system in order for the progression of primary space to be recognized as conventional space in a three dimensional generalization of that concept. By this requirement all points in the entire physical universe of motion are at the same stage of the natural progression of the fundamental background of the natural reference system. It is this background, the natural reference system, that is absolute. With respect to a spatially or temporally fixed reference system the background of primary motion is an incessant outward progression, but within itself it is absolutely unchanging. Without this condition it would be impossible to determine the speed of progression of light or anything else.

The Postulates, definition, and characteristics of motion require that for motions to exist they must be represented in a three dimensional mathematical system by representationally placing them relative to dimensions that are geometrically perpendicular. The geometric perpendicularity of three dimensions require that the dimensions of each reference point be relative to the dimensionality of either space or of time, since motion is posited to be three dimensional. This means that if the reference point is dimensional in the space aspect, then for the time aspect of motion, only the scalar progressive character of time can be observed relative to that reference point.

Since all reference points of which WE have any awareness are in the dimensionality of space, WE can experience only the scalar progression of time. Conditions would be reversed if our existence were in a three dimensional temporal reference system. The principal consequence of this condition is that the physical universe is composed of two reciprocal sectors; the Material Sector and the Cosmic Sector. The space of the Material Sector of the physical universe would be the time of the Cosmic Sector, and in exactly the same manner our time becomes the space of the Cosmic Sector. Sentient beings in either sector of the physical universe cannot determine which sector they are in because both sectors have the same characteristics. Both sectors are identical from that sector's viewpoint. Thus, there is for each and every reference point phenomena an apparent four dimensionality, three geometric dimensions and one scalarly progressive dimension. That is why those equations work, not because matter is dispersed in a four dimensional space-time continuum. The universe as we observe it is like a continuum because motion is continuous, not because of an infinite divisibility of either space or time; motion is posited to be unitary. Failure to recognize the three dimensionality of time has led to the false conclusion that time and space are variable.

A realization that must be maintained if any general understanding is to be gained of this system of theory is that units of motion are fundamentally all alike. A displacement unit of motion is merely oriented in opposition to a primary unit of motion in one aspect or the other. The opposition may be with respect to the spatial aspect of primary motion or it may be in opposition to the temporal aspect of primary motion. The necessity for representation of motion in a dimensional system of coordinates causes the requirement of representing all units of motion in a manner having direction.

The stipulation that a commutative system of mathematics be used to show the variety of ways in which those units of motion can be represented at individual reference points requires modes of motion beyond those which can be represented in a generalized portrayal of the characteristics of all posssible orientations of many such reference points with respect to each other.

ALL generalized dimensional reference systems fail to represent any directional difference between primary motion of the natural reference system and any coexisting opposition to or displacement from primary progression. All observable motion in a generalized dimensional system relative to any reference position is confined to being represented by one directional linear movement from the reference point outward in the generalized apparently fixed reference system of space. All unobservable motion is unobservable because the general system cannot represent it as anything other than as a scalar quantity having no specific directionality; i.e., the phenomena of energy, charge, mass, etc..

Logic requires a point to exist prior to a line which includes that point. Logic also requires primary motion to exist prior to any possible opposition to primary motion and, therefore, unopposed primary motion must always be present and representable relative to every reference point coordinate system. One of six linear directions must be specifiable as the direction for the progression of the primary motion of the natural reference system relative to each identifiable reference point because "one" precedes all other numerical quantities; i.e., one of

two linear directions along any one of the three dimensions of the reference point coordinate system must be representable as the direction in which primary motion is being represented. Therefore, a dimension must be left open, undisplaced linearly, for representation of primary motion in each individual coordinate system if at all possible. Conditions will be discussed somewhat later in which such representation is not possible. A specific phenomena is exhibited as a result of having each specific kind of displacement in that dimension. The question of whether the representation of opposition to linear primary motion results in movement of the reference point with respect to other reference points in a generalization of the three dimensional system is a function of the scalar magnitude of the combination of displacements at each reference point under consideration.

The necessity for unique directionality of representation of each unit of displacement motion, relative to a three dimensional coordinate system in which they are being represented, is a result of having to represent the motion in a three dimensional coordinate system. The sequentiality of the number system which is the principal determining factor for the sequence, once a displacement must be represented. Units of motion at a reference point must be represented in accord with the total effective magnitude of displacement caused by the mode and direction of each next unit. Once uniqueness of representation within the reference point coordinate system is accomplished, consideration of the effect of random orientation of the coordinate systems causes maximum distribution of the effects in a generalization of the coordinate systems; i.e., in either dimensional space or dimensional time. Random orientation causes most of the modes of representing the motions at each reference point to have an overall scalar effect with respect to the motions at other reference points due to lack of congruent alignment.

The inability of the generalized system of coordinates to differentiate between inward and outward, and the fact that all directions are outward from each reference point in a generalized system requires designation of reference point types as an auxiliary device by which to facilitate derivation of mathematical expressions for the phenomenal results caused by each different mode and direction of representation of displacement motion.

In the previous article discussing concepts of mathematics it was found that quantities represented within specific coordinate systems could be one directional or two directional; i.e., both directions concurrently. Remember that so far as the representation of motion is concerned at a specific reference point, that point is the only thing in its universe and no two units of motion can be represented in exactly the same way. Several units may be of the same mode, but if so, they are not oriented in exactly the same way. As a consequence of representation possibilities for quantities at individual reference points and identifying motion as the variable undergoing analysis, the realization that the quantities being referred to are units of motion means that there can be no *a priori* requirement for a unit of motion in an individual reference point coordinate system to be limited to one linear direction under any conditions other than that caused by its position in the sequence of representations.

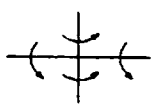
The actual sequence of modes of representation for units of displacement motion at individual reference points is fixed due to probability relations among the modes up through certain of those modes. From that point in the sequence the random distribution of effects in the generalized coordinate system of space causes some variation among possible combinations; this is a net scalar magnitude effect and the fact that motion is unitary. Where variations can occur each possibility is observed with the resultant effect of a given combination at a specific reference point remaining fixed for a measurable amount of time, some combinations indefinitely long. This makes it possible to identify the phenomena associated with each possible combination.

Modes of motion possible at individual reference points are:

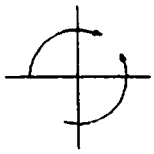
# Dimensions	TYPE	displacement dir.
# directions		# displacements

L^{*}, the normal progression of the natural reference system required of all reference systems individual and generalized,

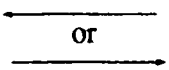
$^{1}_{2}L^{* \text{ or } -}$, one dimensional, two directional linear displacement in either the positive (toward smaller values of motion) or negative (toward larger values of motion) direction from unity.



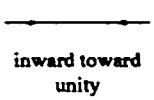
$^{2}_{1}R^{+-}$, two dimensional one direction rotational displacement in either the positive or negative direction from unity.



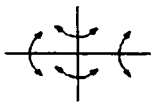
$^{1}_{1}R^{+-}$, one dimensional one direction rotational displacement in either the positive or negative direction from unity of an entire previously represented structure having $^{2}_{1}R$ displacement.



$\{^{1}_{1}L^{+-}\}$, one dimensional one direction linear displacement of an entire previously existing compound rotationally represented structure; the displacement is in opposition to the unit of linearly represented primary motion with which the compound motion structure is currently associated.



$\{^{1}_{2}L^{+-}\}$, one dimensional two directional linear displacement of an entire previously existing compound rotationally represented structure; the displacement is in opposition to the unit of primary motion with which the compound motion structure is currently associated.



$\{^{2}_{2}R^{-+}\}$, two dimensional two direction rotational displacements added to specific two dimensional one directional rotationally represented displacements of certain compound motion structures (all two dimensionally rotationally represented structures cannot support these displacements).

$\{^{1}_{2}R^{+-}\}$, one dimensional two directional rotational displacements added to specific one dimensional one directional rotationally represented displacements of most rotationally represented compound motion structures.

It is not necessary to require motion to be limited to the four modes of motion observable for conglomerates of complex motion structures. Direction is a mathematical property that is observable in a generalized three dimensional coordinate system as a result of the compounding of units of motion in specific individual coordinate systems. $\{^{1}_{1}L+\}$ units of motion added to individual reference point coordinate systems, individually or individually within aggregates of such systems in generalized space, have the effect of moving the individual system or the aggregate vectorially with respect to a previous location of the system/aggregate in generalized space.

Specific combinations of displacement motions will be discussed in other articles in the series.

American Military Training Manual TM 200025 (1928)

DEMOCRACY: A government of the masses. Authority derived through mass meeting or any other form of direct expression. Results in a mobocracy. Attitude toward property is communistic, negating property rights. Attitude toward law is that the will of the majority shall regulate whether it be based upon deliberation or governed by passion, prejudice and impulse without restraint or regard to consequences. Results in demogogism, license, agitation, discontent, anarchy.

REPUBLIC: Authority is derived through the election of public officials best fitted to represent them. Attitude toward property is respect for laws and individual rights, and a sensible economic procedure. Attitude toward law is the administration of justice in accord with fixed principles and established evidence, with a strict regard to consequences. A greater number of citizens and extent of territory may be brought within its compass. Avoids the dangerous extreme of either tyranny or mobocracy. Results in statesmanship, liberty, reason, justice, contentment and progress.

Action at a Distance

A Question of Viewpoint

Josef Hasslberger

Abstract

A philosophical description is proposed, of the basic mechanisms of physical universe and especially of the nature of matter, that is compatible with such phenomena as instantaneous action at a distance. It is proposed that material existence in physical space is conditioned and indeed dependent upon the existence of energy patterns necessary for matter to manifest and that interactions occur not between the material manifestations but between the primary energy patterns themselves.

Philosophies

Action at a distance would seem eminently possible if not probable, providing we integrate our purely physical picture of the universe with a concept of energies originating from a non-physical-universe source. As foreign as this may be to physics, we may need to start considering the possibility of a "spiritual ingredient" or "consciousness ingredient" in all things physical.

Eastern philosophic concepts have long held all material things to be filled with or interpenetrated by a life force (Ki, Prana). It would seem to me that our "scientific" denial of those things we are not able to measure is severely limiting our understanding and our ability to conceptualise existence in the material world. To be sure, there is a timid opening of western science to these concepts, witness books by Fritjof Capra and others, but by and large, anything that is not immediately accessible to measurement is still not welcome.

Shiuji Inomata has proposed to integrate the current scientific paradigm with a "consciousness" parameter. He outlines the necessary shift of paradigm in a paper entitled "Science of Consciousness and new scientific world view—we are in the midst of the second Copernican revolution"[1]. Inomata proposes a triangular relationship between matter, energy and a consciousness parameter designated as "Q".

In line with the work of Inomata and others, I would like to propose here a concept by which instantaneous action at a distance could be explained and I am asking the reader to forgive me if I am requiring you to stretch your imagination into an area that would seem to lay outside the province of physics. Some may even experience the ideas put forth in this paper to be a bit "unsettling" to their understanding of universe, based on the conventional scientific view.

Dimensions

Our physical world is said to be three-dimensional, with reference to the basic three degrees of freedom of movement we find to exist in a right-angle-co-ordinated cube-based spatial reference system as first proposed by Descartes (up-down, left-right and forward-backward, to express this in simple terms).

Although I assent to use the word three-dimensional to indicate physical space, I have shown[2] that one could with profit describe physical space in a four-dimensional tetrahedron-based spatial reference system just by changing from 90 degree co-ordination to 60 degree co-ordination. The advantage of such a system would be an immediate orientability in physical space having to consider only four vectors, instead of six vectors (as above) of the Cartesian system.

The word three-dimensional, although in general use, is thus not an indication of any real physical properties inherent in space. It is merely a conventional way of looking at and describing space, based in Euclidean geometry. In fact, Euclid taught a progression from point (dimensionless) to line (one-dimensional) to plane (two-dimensional) and finally to space (three-dimensional). I propose that this system of geometry does not have any real physical significance and is merely an abstract way of conceptualising physical space.

We may however use Euclid's concept of the (two-dimensional) plane and its relation to (three-dimensional) space as an analogy useful to the understanding of what follows here. As inhabitants of physical ("three-dimensional") space we would have an inherent advantage over a hypothetical inhabitant of a two-dimensional universe contained

within our universe. We would in fact be able to observe, from our vantage point, any point of the plane and thus would be able to accede to any point of that universe without having to "travel it's space" like the inhabitant of the two-dimensional universe. This, to our two-dimensional friend, would be somewhat of a miracle, he would call it "instantaneous action at a distance" on our part.

In this same way, we should imagine a "four-dimensional" entity to exist, which contains within itself our "three-dimensional" universe and which has a similar advantage of being able to accede to and act at any point in our space, without having to traverse our space in the way we need to traverse space to arrive at our destination. I believe that one could call that "four-dimensional" entity hyperspace.

Motion

In an unusually insightful manner, Gian Piero Godone[3] has proposed his "Fourth Principle of Dynamics," adding to our concepts of motion and dynamics codified in the days of Newton. The principle was first presented in Fivizzano, Italy in October 1994 and reads:

- "Motion of bodies through space is directly mediated, in a sequential fashion, by all those particular basic elements which permit the very existence of the bodies in the first place."

Subsequently, Godone has re-stated the principle in a more articulated way. The following is the latest (February 1998) version of Godone's Fourth Principle of Dynamics:

- "Any possible motion of all bodies is due directly to the natural motion of their basic elements, which by their specific sequential behaviour ensure the stable existence of the bodies; such sequentiality being the consequence of constant interaction with ever new basic elements arriving in an orderly fashion from space and subsequently returning to it."

We are accustomed to consider matter as fundamentally different from space and from what might fill space. To some of us, space is empty, except for the matter it contains. Thus, to an observer within this universe it may appear that motion of material bodies is a moving of such bodies from one location to another, through basically empty space.

But if we reason with Godone, and I tend to agree with him on this count, there is really no such thing as motion in the way we imagine it, there is only an appearance of motion. Each material body consists primarily of a stable energy pattern, which is the cause of the manifestation we call matter. When in motion, the physical manifestation of the body is being successively re-constructed out of new "basic particles" each time it changes position.

An excellent analogy of this apparent motion would be our familiar TV. We see pictures in motion, but what really happens is that an electron beam lights up successive points of phosphorescent material on the inside of a glass screen, giving us the idea of a picture. By successively lighting up different sets of points, that picture on the screen seems to come to life, it seems to move.

Particles of Matter

As Godone succinctly implies with his principle of dynamics, a very similar mechanism is at work in our physical world. Particles are actually created and constantly re-created by an energetic pattern which is maintained and sometimes animated by what I would call "life force".

Space is not empty. It is a plenum. Matter is a special state of the plenum of space. It has recently been proposed by Paul E. Rowe in an interesting series of articles printed in *Infinite Energy* magazine[4], that space is filled by kind of a Bose-Einstein condensate of hydrogen, that is, by a close-packed matrix, a "soup" of electrons and protons.

Rowe bases this conclusion on the fact that hydrogen can be created from space under certain energetic conditions, as described in his papers. "Rowe's soup", which in practice fills all space, supplies the "basic particles" that according to Godone are necessary for matter to exist and to move.

Energy

We are using electric energy in our daily lives without having a firm understanding of what this energy actually is. To be sure, we have a working knowledge of how electricity behaves, we can engineer applications of it, but ask anyone to explain the basic principles behind electricity or magnetism—if you dig far enough for a basic explanation, you will get an embarrassed silence.

Thomas E. Bearden explains, in a recent article,[5] that there is a great disparity between the energy that

flows from a dipole and that actually captured and put to use in our electric or electronic apparatus. The energy flow from a battery or a generator is much larger; something on the order of 10^{13} times the amount of conventionally used energy. According to Bearden, there are some basic flaws in our way of explaining and utilising electrodynamics. One might agree with Bearden or not, but to be sure, there are fundamental shortcomings in our theoretic understanding of energetic processes that are at the basis of what is generally called "free energy."

Torsion fields are another case in point. They are highly penetrative energies which have been demonstrated to "propagate" at superluminal velocities. Our knowledge of these fields is based largely on research done in Russia[6] by A. Akimov and G. Shipov. A recent summary of relevant research has been published by Donald Reed[7]. We are still grappling to find a mechanism that allows such speeds in physical space and are theorising "wormholes" and "time reversal."

There may however be a much simpler explanation for these phenomena, if we can take the step and open our mind's eye to the possibility that the universe does not only consist of matter and energy located in and operating through space, but that at least part of that energy is resident in and operating out of what I described as hyperspace.

Life force

I propose that all matter is created and continuously re-created by what I would call "life force." This force provides patterns of energy which "materialise" parts of the medium that fills space, coagulating it into what we perceive to be particles of matter.

There is a vast range of complexity of these particles from hydrogen to the heavy elements. There is as well a vast range of extension, from single particles to planetary and stellar masses. And there is another distinction, between what we call "dead" matter and what we call "animated" or "full-of-life" matter, such as plants, animals and human bodies.

The differences however are only quantitative, not qualitative. It is the same life force or life energy in different quantities and different degrees of mobility and individual consciousness that is responsible for the various manifestations of matter.

Interactions

Electric, magnetic and gravitational interactions between matter are mediated by energy. Patterns of energy associated with matter are postulated as being provided by life force. Consequently, the interactions would appear to be between the energy patterns, rather than between the particles of the bodies themselves.

Life force is not part of our three-dimensional space but, residing as it were in hyperspace it is, as discussed above, one step above the dimensionaltiy of space. It is not bound to travel "through space" and thus is capable of manifesting it's effects in distant and diverse locations at the same instant. Consequently, interactions that are energy-pattern interactions are not limited by speed of light.

We thus have not only a possibility of "instantaneous action at a distance" but also of particles disappearing in one spot and reappearing in another, which agrees with recent experimental evidence. From here it is a simple step to extend the concept and include phenomena such as telepathy, telekinesis and teleportation, which so far have been relegated to the margins of science. These will, one day in the not too distant future, become normal occurrences quite within the province of scientific investigation.

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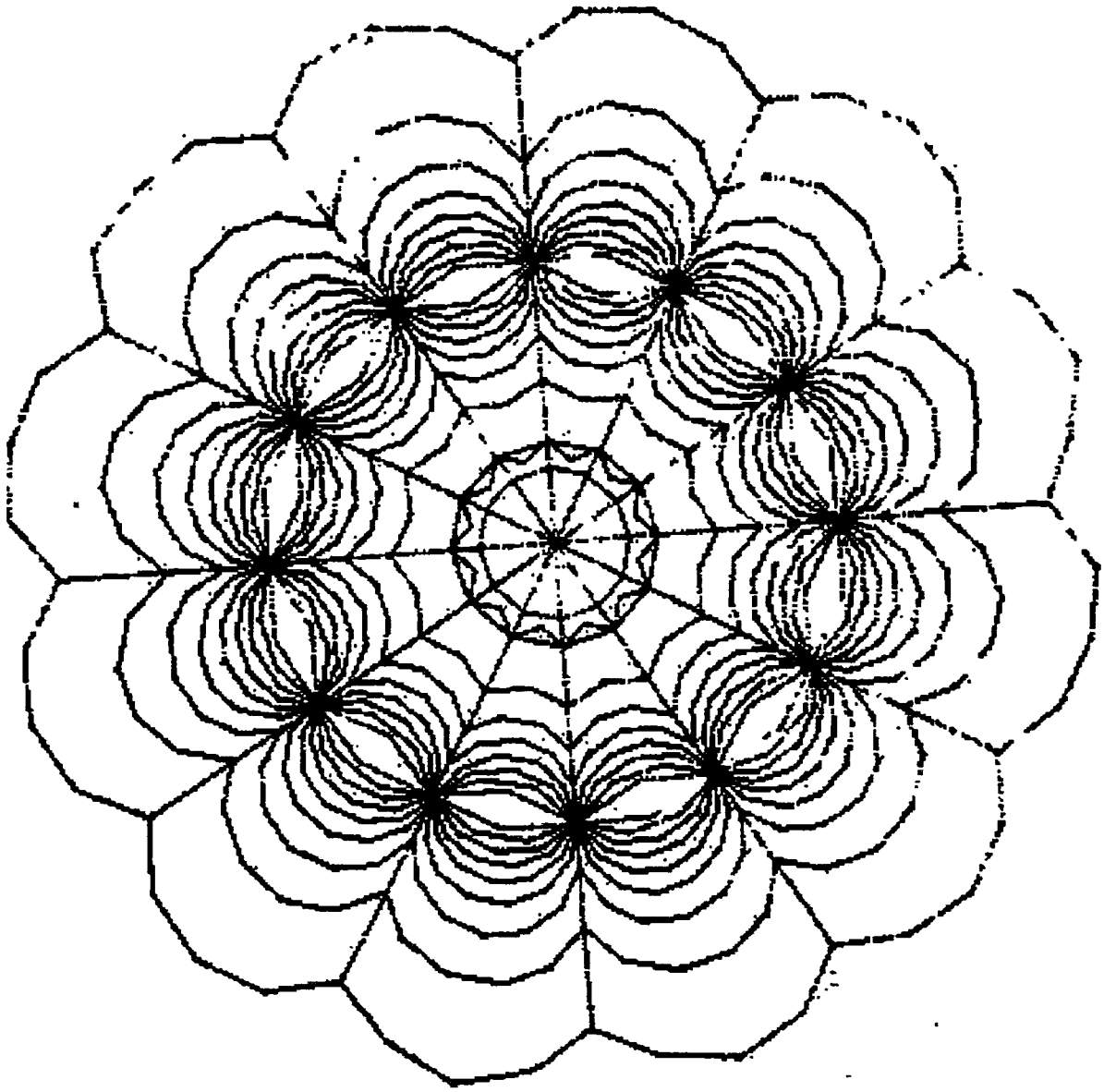
Diagram 9 of

The Interaction of Electromagnetism and Gravitation along Equipotential Lines



The Interaction of Electromagnetism and Gravitation along Equipotential Lines

A Prelude to Advanced Energy and Propulsion Technology

Russell Kramer

When I first encountered the Reciprocal System of Theory it absorbed my attention immediately with its myriad of dynamic concepts. These include motion in time, rotationally distributed scalar motion, the three dimensions of time corresponding to the three dimensions of space and the reciprocal relation between space and time which is motion itself. Larson's ability to integrate all this and many more key insights into an integrated general holistic theory is truly an outstanding achievement. All of these and many more viable insights into universal *a priori* physical events led me at one to reconcile The Reciprocal System of Theory with various other geometric systems also based on scientifically verifiable phenomenon. This includes 'Synergetic Geometry' and The 'BiRadial matrix'. These will be explained in the proper context later in this paper.

While exploring the vast world of possibilities opened up to us by The Reciprocal System of Theory, I am also synthesizing this with the aforementioned Synergetic Geometry, The BiRadial matrix and related systems. There is a common purpose for this and more to this story; we shall begin.

Preface

There are technological applications of the Reciprocal System of Theory, which deal with clean energy and propulsion. This has enormous potential benefit for mankind. In order to develop a specific basis for describing these technologies (both new and prior arts) geometric models will be employed extensively. Larson, in reference to The Reciprocal System of Theory states: "...it lends itself readily to representation by pictures and models." There are certain descriptions of atomic structure, three dimensionally rotationally distributed scalar motion and the space time progression. These models are very useful and they will be developed, refined and interpreted in this paper.

The geometric modeling used throughout this work represents a parallel, partially overlapping development to the Reciprocal System and was conceived independently. Any conclusions derived from this, which are consistent with the Reciprocal System of Theory, will only further validate both systems. Here is a direct relation between the present work and 'Synergetics', as originally propounded by the late Buckminster Fuller. His nature based coordinate system gave rise to a detailed system he named "Synergetic Geometry". There are profound similarities and equally profound differences between these two systems. Also there are two key aspects of the present work. The BiRadial matrix itself which is a concise geometric model as such consisting of lines, angles and so on, and the subsequent physical interpretation of this model as it relates both to the Reciprocal System of Theory and observed physical phenomenon. There are two basic premises in using the geometric topological models illustrated in the following:

1) There is a direct correspondence between the known motions of the Universe (otherwise known as "forces") and the geometric-topological elements including lines, angels, genus, inwardness and outwardness.

2) Our own perceptual and conceptual apparatus (our means of interacting with our surroundings) is directly interrelated to the three dimensions of space and the three dimensions of time. (This second premise will be dealt with in a later article. This is an important adjunct to one or both of the fundamental postulates of The Reciprocal System of Theory.

It will be demonstrated that the operational principals of certain unconventional energy and propulsion technology result from the interaction of electromagnetic and gravitational forces along equipotenetial lines. There are various "N" machines that are reported to have attained "over

unity" energy output. "N" machines, as I have come to understand the term, are based on the original homopolar generator constructed by Michael Faraday. It consists of a cylindrical conducting disc immersed in an axial magnetic field that can be used as a generator with sliding brushes extracting current caused by the voltage induced between the outer and inner regions of the disc when the rotational energy is from an external driving source. Later scientists, including Bruce DePalma, have constructed N machines based on variations of Faraday's original design with varying degrees of over unity energy output reported.

Many of these machines are presently explained in terms of the "tachyon" theory and other related theories. There are also the "æther" theory (past and present), "Zero point energy" and various extensions of quantum and relativity theory. The Reciprocal System, The BiRadial matrix, along with Synergetic geometry and related systems in concert with each other offer, I believe a more generalized and comprehensive foundation for explaining these machines; including how these phenomenon are related to the innate geometry and topology of the universe.

Moreover there are a number of "electro-gravitic" energy and propulsion systems whose underlying process and performance characteristics can be readily explained by the present systems combined. The sudden bursts of acceleration and stops along with right angle turns and other difficult maneuvers with the presence of radiation are often noted during or just after sightings of "Unconventional Flying Objects" (UFO's). The present work will provide a foundation upon which such a propulsion system and related energy systems with radical performance characteristics can, in principle be built with our present technology on a sound scientific basis.

Larson states: "Gravitational energy is not *interchangeable* with other forms of energy... *It is true a change in location results in the release or absorption of energy*, but the gravitational energy at point A cannot be converted to any other type of energy at point A nor can the gravitational energy be transferred unchanged to any other point B [*except along equipotential lines.*]" (Italics mine) This is important and the very nature of these equipotential lines and a geometrical interpretation of these in light of Larson's statement will be explained in due course.

Abstract

The technological applications of The Reciprocal System are enormous. From quantum mechanics and Relativity came photo-voltaics and atomic "nuclear" energy in wide spread applications. The Reciprocal System and its co-existing geometrical counterparts are a major development since Relativity and Quantum Theories evolved. Are there technologies that constitute an analogous improvement over existing technology based on the Reciprocal System of Theory? How can The Reciprocal System be translated from theory to practical benevolent technology?

The Reciprocal System, in addition to predicting the existence of phenomenon inaccessible to observation (motion in time for example), also anticipates novel forms of energy and propulsion technology. What new technologies will arise from the Reciprocal System? What light does this shed on the understanding of "Over Unity" energy and "zero point" energy? How can it shed light on the technical challenges we face in:

- Permanent Magnet motors?
- Methods for harnessing "atomic" energy?
- Designing new propulsion systems?
- Cold Fusion?

Requirements for the Technological Applications

Properly establishing the technological applications of the Reciprocal System for radical energy and propulsion systems requires evaluating the three basic laws governing electricity, magnetism, and gravitation with a review of the term "F". In terms of electricity "equipotential" describes points in an electric field, which are at the same electrostatic potential. An equipotential line traverses all those points with the same electrostatic potential and is in 90-degree orientation in relation to the field lines. The electrostatic potential at a point is the work done against the forces of the electric field in bringing unit positive charge from a point at zero potential to the assigned point. There are analogous magnetic and gravitational "equipotentials" to be dealt with presently.

Three fundamental inverse square laws for attraction and repulsion.

Gravity.

$$F_g = G\ M_1M_2/\ d_h^2 \qquad \text{Eq. (1)}$$

G = Gravitational Constant
F = Force of Gravity
M_1 = Mass 1
M_2 = Mass 2
d_h = Distance between centers of M_1 and M_2

Magnetism

$$F_m = A P_1 P_2 / d^2 \qquad \text{Eq. (2)}$$

A = Constant of proportionality
F = Force of magnetism
P_1 = Pole 1
P_2 = Pole 2
d = distance between centers of P_1 and P_2

Electricity

$$F_e = K Q_1 Q_2 / d^2 \qquad \text{Eq. (3)}$$

K = constant of proportionality
F_e = electrical force
Q_1= point charge 1
Q_2 = point charge 2
d = Distance between centers Q_1 and Q_2

Diagram one represents a gravitational mass whose center is at N_1. The direction of the field is everywhere radially inward and the spacing of the lines shows the field is stronger at the surface and weaker away from the surface. As many radial lines as desired can be drawn to represent the field but they must be equally spaced. The more lines, the greater the corresponding mass.

These diagrams represent an "ideal mass"; that is one with uniform distribution of mass. Rotation can be imparted in one or more axis (corresponding to rotationally distributed scalar motion). We will momentarily freeze this motion to glimpse at the geometrical and topological structure of gravitation. In diagram 1 there are 36 equi-spaced radial lines. The specific units of measure (e.g. metric tons, micrograms, etc.) will be dealt with later. The model consisting of concentric radial lines is employed extensively by Buckminster Fuller in is epochal work "Synergetics", in which he develops a comprehensive model of natures coordinate system. The extensive use of equi-spaced radial lines through out both volumes (Synergetics 1 and 2) is including detailed explanation as to how these radial inward-outward lines correspond to gravitation and radiation respectively. This same model us employed in more conventional textbooks as well. For now let us allow that the number of equi-spaced radial lines corresponds to "mass" in some way.

Referring again to diagram 1, N_1 = number of rays from N_1 and N_2 = number of rays from N_2. The following point is crucial. That is the model of a gravitational mass (a single pole with equi-spaced radial lines) found in textbooks appears to be derived from a thought process not unlike the following: Observation indicates that objects fall towards the Earth's center (of gravity). Also the rate of acceleration of falling objects from the same elevation above sea level any place on Earth is the same; therefore the gravitational field of the Earth is uniform (in theory). This is thus represented by the uniformly distributed equiangular radially inward lines. The closer the lines are the stronger the force of gravity or the "denser" the gravitational field. This is generally consistent with observation. This model is further reinforced by the following facts: the rate of a falling object toward the Earth conforms to an inverse square law. In geometry, as a concentric surface (sphere or a regular polyhedron) contracts toward or expands from a central point or "pole," the area of the surface changes by the square of the distance from the center; thus also conforming to an inverse square law. (See diagrams 4 & 5 and equations 1, 2, & 3.

From all of the aforementioned (and likely other factors as well) it is concluded that gravity is monopolar (i.e. emanating from or centered about a single source or point.) This is hardly ever stated, yet it is implied in most extant theories and models dealing with gravitation. While it is true that the inverse square relation in diagrams 4 & 5 holds true for most if not all polyhedrons, and while it is also true that Newton's law of gravitation (equation) is also an inverse square law, it does not follow that the former is the basis of the latter. At some point it was concluded that since gravity and the monopolar surface expansion and contraction phenomenon both obey an inverse square law that gravity must be monopolar. I believe this is a basic epistemological error that has greatly hampered our efforts to relate gravity with electromagnetism in a precise and quantifiable manner; as will be demonstrated.

When observing objects "falling" towards the Earth, (Newton's legendary apple, for example) because of the relative vastness of the Earth in relation to the apple (among other possible factors) it is assumed that the Earth's center of Gravity is the sole reference point which the apple is falling towards. Again this model assumes ideal conditions where the density of a given mass is uniform. In any case the Earth is (if only to a slight degree) "falling" towards the apple. In fact an observer on the apple would measure the Earth falling toward the apple at 32 feet per second squared. The point is that any attempt to measure the Earth's, or any other body of mass's gravitational field means introducing another instrument (as simple as a falling apple). This instrument is not measuring the Earth's gravitation; rather it is measuring the (apparent) interaction of the Earth's gravitation with its own gravitation

complete with its own center of gravity. With regards to the Reciprocal System, Larson states that gravity is not an interaction or "action at a distance" as such. "Like the gravitational motion, the motion which gives rise to the electric or magnetic forces is a motion of the individual atom or particle with respect to the general structure of space time, not an action of this unit on some other charged or uncharged object as it appears to be." Returning to equations 1, 2 and 3 it becomes clear, or at least entirely plausible, that the two poles of gravity are the two masses M_1 and M_2. This is a critical distinction. It clearly reveals that gravity has at least a bipolar (BiRadial) structure if it is not entirely bipolar or multi-polar. It appears to suggest that gravity, as expressed in equation 1, requires the presence of (at least) two masses and in this respect can be considered bipolar or "BiRadial". Buckminster Fuller states "Unity is plural and at minimum twofold". In the present context this suggests that to have unity (unification) of a field requires the presence of two masses or poles of some sort. We will in fact arrive at an inverse square equation based on BiRadial geometry.

Once it is established that gravity has bipolar, even multi-polar properties, the geometrical and mathematical unification of gravitation and electromagnetism is closer at hand. In fact, for a single equation to unify the three above equations would require at least two qualities: first it would need a variable in place of the three constants contained in the three separate equations. (The variable would correspond to either one of the three constants.) Also, there would need to be a variable unit of measure, which would correspond to electricity, magnetism or gravity. As we know from the Reciprocal System, the units of measure are rotationally distributed scalar motion, which can be further simplified into discrete space-time relationships.

Diagram 3 represents two identical masses separated by a distance "D". Diagram 6 shows the intersection points of field 1 and 2. What is the significance of these points? How do they relate to gravitation or Electromagnetism? They are reminiscent of the points on the expanding balloon used by Larson and others to represent scalar motion and the outward space time progression. This array has both a macroscopic and microscopic physical analog. For example if we view the distance between the poles as very great and increasing over time this model depicts the outward scalar motion of the universe. If we view the distance between the poles as extremely minute, we can view this array as depicting the highly concentrated "Lines of force" present on the atomic and sub-atomic level. There is a direct relationship of these points to scalar motion to be further elaborated on. There are several symmetrical patterns, which can be derived from this array.

This investigation will examine two variations that relate directly to novel forms of energy and propulsion. Emphasis will be placed on the physical interpretation of the patterns. Certain assumptions are made and rigorously justified before moving on to subsequent analysis and conclusions. Interconnecting the nodes by a certain criterion (which relates to describing the curve mathematically), yields diagram 7. This represents what appears to be a magnetic field (attraction mode), resulting from two opposite poles attracting each other. Interconnecting the nodes by a similar criterion yields diagram 8. This represents what appears to be a magnetic field resulting from two like poles repelling each other. The original rays can be extended in three dimensions, allowing for a more comprehensive model. There is a very distinct relationship between these attraction *and repulsion* lines and actual magnetic lines of force. This demonstrates the utility of The BiRadial Matrix in revealing basic physical properties of "fields". The criterion for connecting the "lines of force" is crucial and involves deriving actual BiRadial equations describing the quantized "lines of force," discovered by Faraday and easily revealed with iron filings in close proximity to a magnet.

We have developed this model to illustrate to masses and the gravitational interaction surrounding them, after having rigorously justifying the use of this model as a viable analogy to gravitation. Could it be that gravitation has a geometrical and topological structure similar to magnetism and also a quantized structural basis for its description within the BiRadial Matrix? The concept of a quantized description of gravitation is a major goal in modern physics. Any complete physical system, be it a theory or model, must account for the specific geometrical and topological structure of primary "motions" of nature. Also it must explain both the similarities and differences between their properties.

As regards to the similarity of the conventional models, such as the electric "dipole", it should be noted that this similarity is not exact. The distance D in the conventional dipole is equal to zero and the related math is divergent from the inherent math in the matrix. Returning to Diagram 3, we can assign specific variables and derive a number of simple yet revealing equations including equation 4. Upon close analysis of this equation it becomes apparent that it has the same form as Equations 1, 2 and 3 and

helps reveal the relationship between all these three equations showing the interrelationship between gravitation and electromagnetism. Derivations aside for now we have:

$$1 = \sin \beta / \sin \alpha + \sin \alpha / \sin \beta - \cos \theta (a\ b) / D^2 \qquad \text{Eq. (4)}$$

There is a variable in place of the three constants–in place of the force factor on the left side there is a "1". How is this to be interpreted?

Syndyne is conducting research and development in this area with a firm conviction that extensive analysis of the BiRadial Matrix and related math can reveal such interactions and provide a greater subtlety of understanding the basic "forces" of nature. What is happening is that both the inherent geometry of the matrix along with the related math are both simultaneously pointing to the interrelationship between gravity and electromagnetism; there being total internal consistency. As will be further elaborated upon, the BiRadial and PolyRadial Matrix explains the structural aspects of the interaction between gravitation and electromagnetism. While the Reciprocal System addresses this, and thoroughly explains other related issues such as why gravity cannot be shielded, and by integrating the BiRadial Matrix, the Reciprocal System, Synergetic Geometry and related systems, a true comprehensive approach to investigating the Unified Field along with its verifiable and measurable effects (including "cold fusion," "zero point energy" and radical propulsion, for example) is possible.

Returning to equation 4, there is an obvious reciprocal relationship being expressed, which shows a direct relation to the Reciprocal System; the variables *a* and *b* are prominent. So far as I can determine, a and b are related both geometrically and mathematically to the equipotential lines referred to by Larson, and equation 4, with the corresponding diagrams, strongly suggest that electromagnetism and gravitation are indeed capable of interaction along equipotential lines. In fact there are numerous relationships, which directly emanate from this basic system of modeling, of which this is but one example.

The matrix is indicating a coupling effect between electromagnetism and gravitation. This is consistent with current explanations of electro-gravitic energy and propulsion devices and related experiments. At its utmost, this matrix can provide a thorough and detailed foundation for describing primary field interactions, clean energy and propulsion technology, both existing and under development.

When the distance "D" between N_1 and N_2 (see diagrams 3, 6, 7 and 8) decreases, this predicts a collapsing field and enormous inward accelerations of energy. When the distance "D" increases, this predicts an expanding field, and enormous outward accelerations of energy. Also in Diagram 6, by increasing N_1 and N_2 (the number of rays from each pole) to higher values a series of finer wave interference patterns emerge. The relationship of these to the distance between the poles expresses the basic harmonic sequence. Harmonics are logically integrated with the BiRadial Matrix and related to electromagnetism and gravitation. In fact, there is a key contingency of researchers who are keenly focused on the relation between harmonics and gravitation.

The BiRadial Matrix describes this phenomenon implicitly. Just as electricity and magnetism can be derived from each other, the results of the present investigation predict that (electro)magnetism and gravitation, in various states (forms), can be derived from each other is an analogous way and that they are both related to harmonics. This will be elaborated upon in the next article. To be sure the technological applications of this are enormous. It stands to reason that this is the empirical basis for the conversion of gravitation to electromagnetism (i.e. the interaction of gravitation and electromagnetism along equipotential lines.) When we regard the distance "D" as very small on the atomic scale, corresponding to the atomic mass, the repulsive "lines of force" depict a concentrated magnetic potential. The "forces" on the atomic scale are highly concentrated and exist over short distances. By decreasing the number of rays from each pole (corresponding to lower masses such as electrons) and decreasing D, this yields a highly concentrated pattern, which exists over a very short distance. Further illustrations continue to reveal this fact. By following this geometric analogy concisely this model helps explain the unique property and how it *differs* from magnetism and electricity. Further interpretation accounts for the inter-atomic region often referred to as the "nucleus" and shows how it is a concentrated form of the same basic fields being discussed at present.

During my presentation of this BiRadial matrix at the I.S.U.S. 22nd annual meeting, Frank Meyer commented on what the definitions of the "lines of force" are. Much has been observed of these by notable experimental scientists such as Michael Faraday, Nicola Tesla and others. In the present context I am compelled to reevaluate the precise

meaning of "force lines" as they play such a pivotal role in the BiRadial and PolyRadial Matrices.

From what has been revealed thus far, we know that they obey certain mathematical formula which greatly simplify the equations, as compared to the Cartesian mathematical equivalent. We know that these lines of force are quantized. From the Reciprocal System, we can add to this fact that the so-called "force" is really a form of rotationally distributed scalar motion. We know that the precise pattern of these initial "Lines of force" are not exactly similar to the electric "dipole," for instance, and that the BiRadial Matrix takes into account the discrete interaction of forces. As discussed in my previous article, fusion, as such, is not what is occurring in the sun or on the subatomic level. Advanced prototypes of the present model yield a more general set of equations accounting for both the microscopic and macroscopic phenomena including the inter-atomic region. This model has an enormous ability to predict numerous process and physical relationships based on "trans-discrete superstructures". The corresponding mathematics is much simpler using essentially algebra, trigonometry and primary number structural patterns. This is in keeping with the Reciprocal System.

The lines of force in diagram 8 clearly illustrate a repulsive phenomenon, which is the apparent basis for "anti-gravity" propulsion. There will be more on this in the next article. Diagram 9 has a direct relation to atomic structure and provides a detailed description or analogy of the inter-atomic region. It is one of a series of related diagrams where the number of poles "N" can vary from N=2 through N=92 and perhaps beyond. It is a logical extension and generalization of the BiRadial Matrix, and shows further relationships concerning the fundamental motions or "forces" of nature. The general concept, in any case, is that the motions prevalent on the atomic scale are the same basic "lines of force" as electromagnetic and gravitational "Lines of force"; the distinctions are in the relative configuration of the lines of force and their density and degree of rotational scalar motion. In all cases, the common denominators are the lines of force consisting of their quantized segments and angular progressions. Both of these directly result from the geometrical constraints of their finite number of rays emanating from (in this instance) the 12 poles. An entirely new picture of the atom emerges where the surrounding poles form the central region as opposed to the center "attracting" the outer region of the atom. At the same time this model is clarifying the relationship between quantum physics with both electromagnetism and gravitation. This is a major step and the precise mathematical equations along with the geometric structure (as in the BiRadial and PolyRadial matrix) along with related systems, and the theoretical construct (as in the Reciprocal System) are now both in place to proceed on course to bring this research to fruition and culminate in a thorough assessment and description of the "Unified Field" and its unlimited applications. Further in depth explorations of the BiRadial and PolyRadial matrices and there their relation to the Reciprocal System is in progress and shows great promise.

Summary

- Review of the applications of the Reciprocal System.
- Various geometrical models of the Reciprocal System were cited mainly: atomic structure, scalar motion and the space-time progression.
- A working definition of equi-potential lines was given
- A geometric model consisting of equi-spaced radial lines was introduced as an equivalent to mass. The assumptions on which this was based were justified.
- The three primary inverse square laws were reviewed.
- Two distinct geometric models for deriving inverse squares laws were shown
- A case was made for why a BiRadial system should be incorporated in the treatment of gravitation.
- A quantized attraction vector matrix was derived, as was a quantized repulsion vector matrix, solely from geometrical and topological considerations, in particular a BiRadial matrix.
- Numerous physical interpretations presented themselves. These models were interpreted in light of the Reciprocal System and other models including the harmonic sequence.
- A unique inverse square relation was derived from the model, which offers some clue on how electromagnetism and gravitation can interact along equi-potential lines.
- Once the physical relation to the model was

established, possible applications in clean energy and propulsion were discussed.

Epilog

Enormous possibilities lie ahead. We are on the thresh hold of a great era of understanding in science and technology. Progress on both the theoretical and technological fronts is unfolding at a spectacular pace. It is crucial that theoretical and applied physics is integrated and the direct relation between them fortified. The structural aspects of the primary "forces" (equipotential lines among them) are a vital link between physics theory and application.

Post script

The present author, through his company *Syndyne*, is seeking mathematicians, scientists, engineers, computer programmers and sponsors to accelerate the research on the BiRadial Matrix and related technologies. Those interested please contact Russell Kramer at: Syndyne@hotmail.com.

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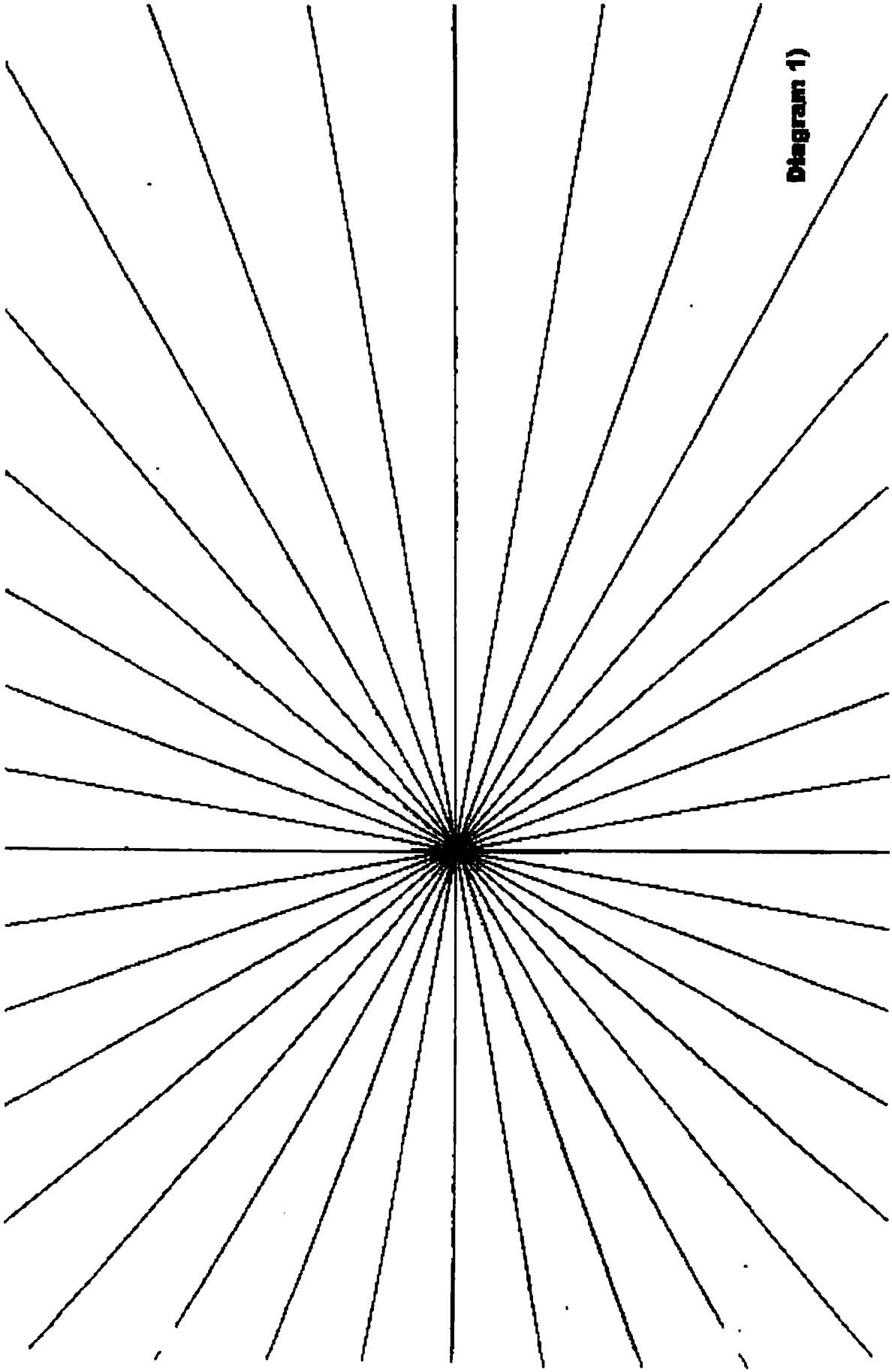
Diagram 1)

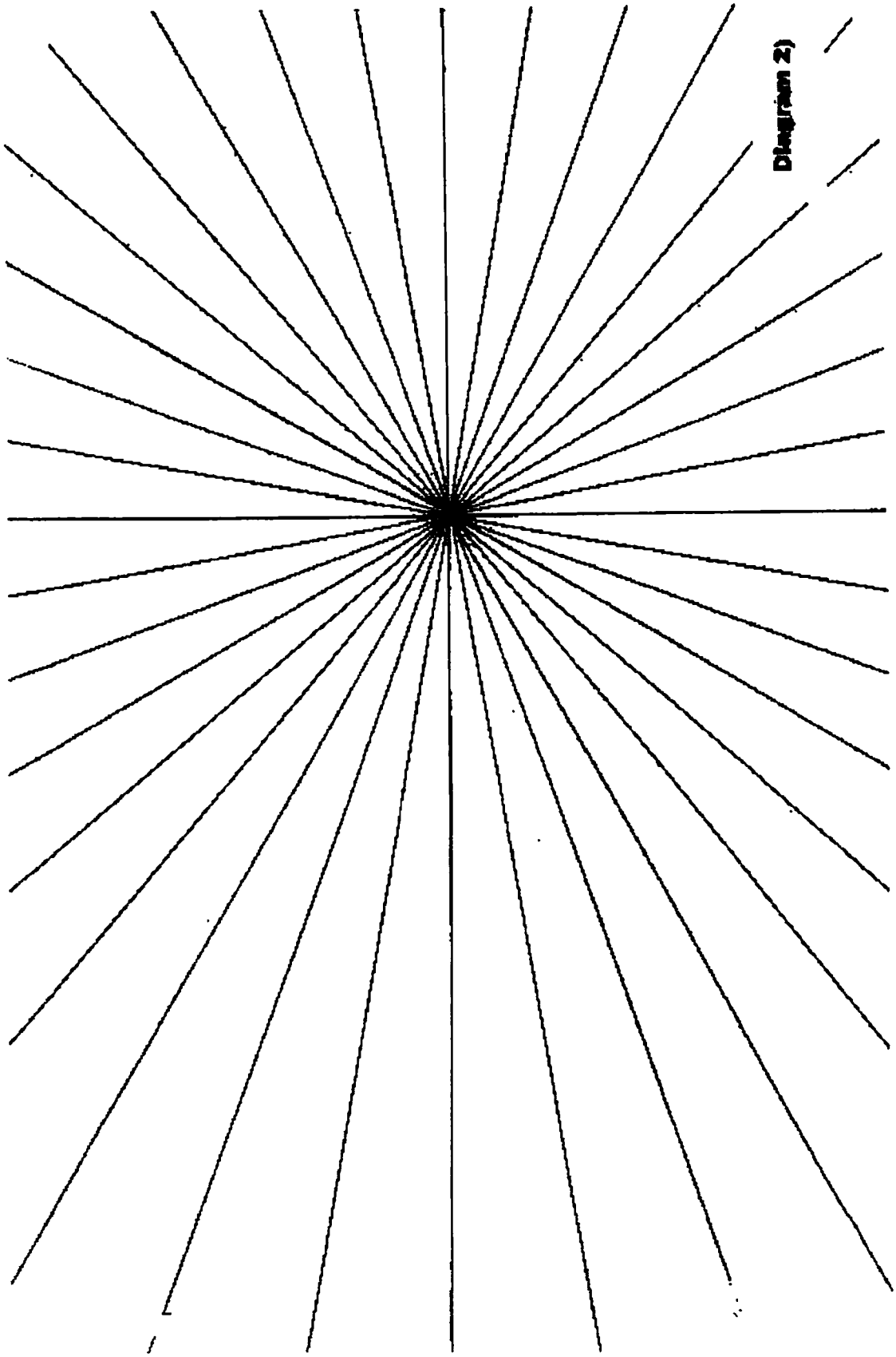
Diagram 2)

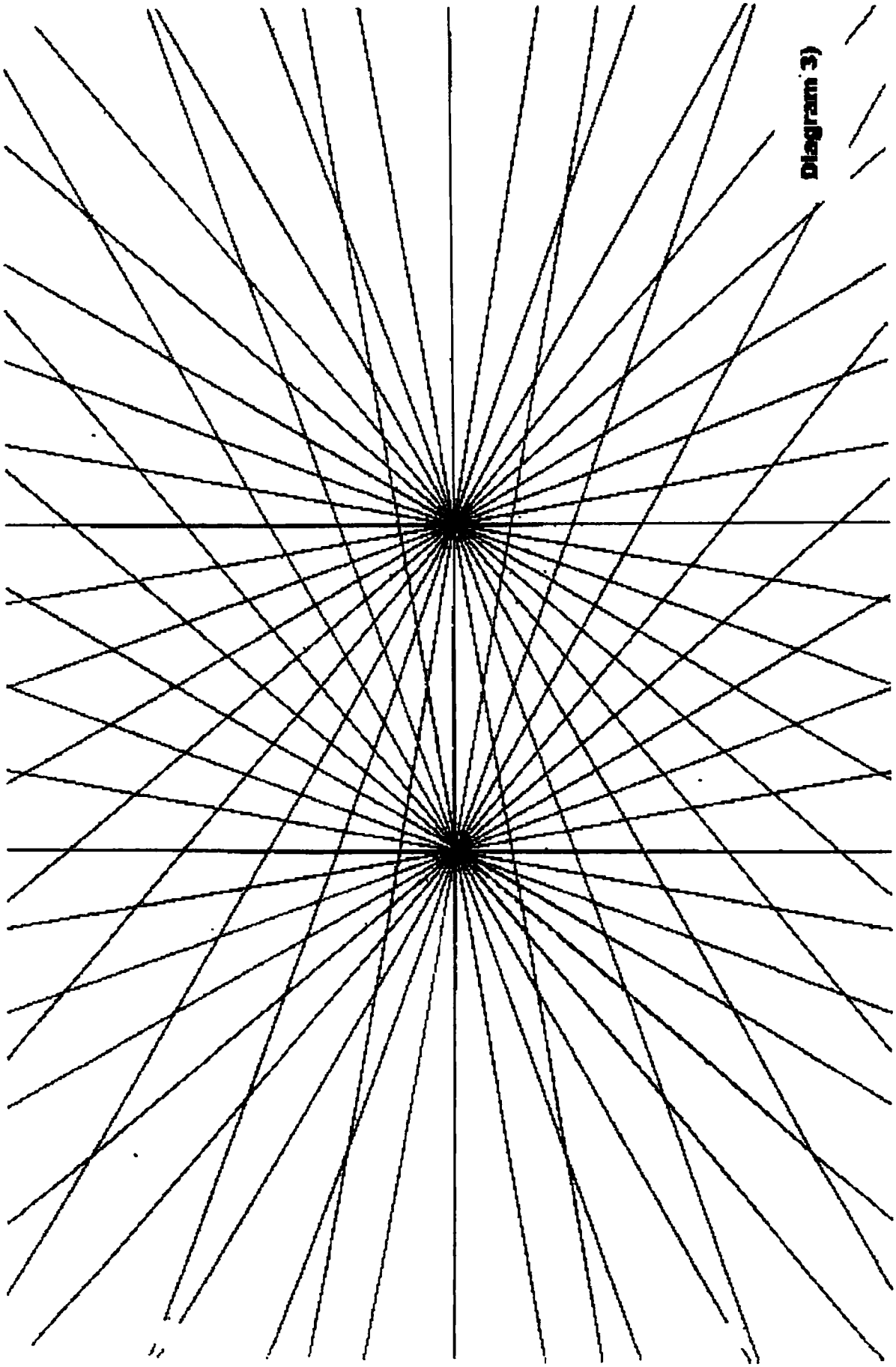
Diagram 3)

Mono-Polar Concentric Surface Area Expansion and Contraction According to Inverse Square Law

As the radius doubles for example the surface area has a four fold increase where:

S = Surface area

R = Radius

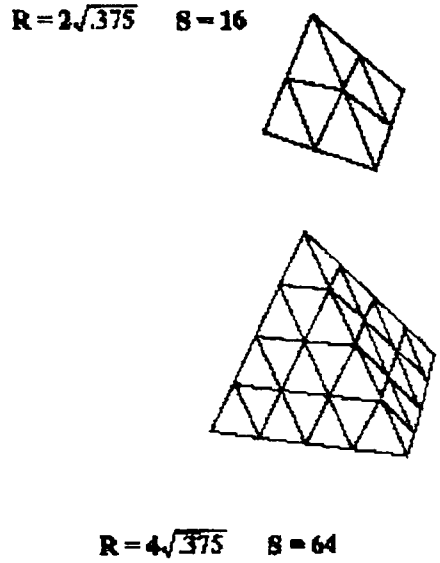

Diagram 4)

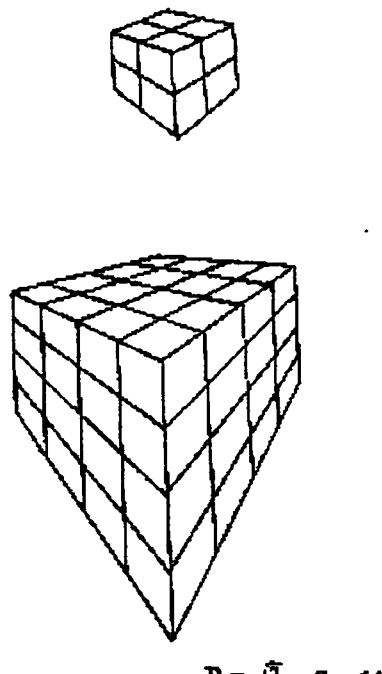

Diagram 5)

It is common knowledge that as the radius of a sphere or a regular polygon (which has a single center or "pole") changes, its surface area changes by the square of the radius and thus conforms to an inverse square law.

It is also known that as the distance from the center of gravity of a given mass changes this strength of the "graviational field" changes according to the square of the distance from the center of gravity.

It has been tacitly assumed that because both of these facts are true that gravity must, as a consequence, be monopolar (i.e. eminating from or centered about a single source or "pole"; unlike electricity and magnetism which are inherently bipolar or "bi-radial" ergo positive, negative and north, south.

The present investigation shows that gravity, like electricity and magnetism is also bipolar or bi-radial. Once this is firmly established, the unification of electromagnetism and gravitation is greatly simplified and the means of harnessing electromagnetic energy propulsion from gravity is in principle technologically feasible.

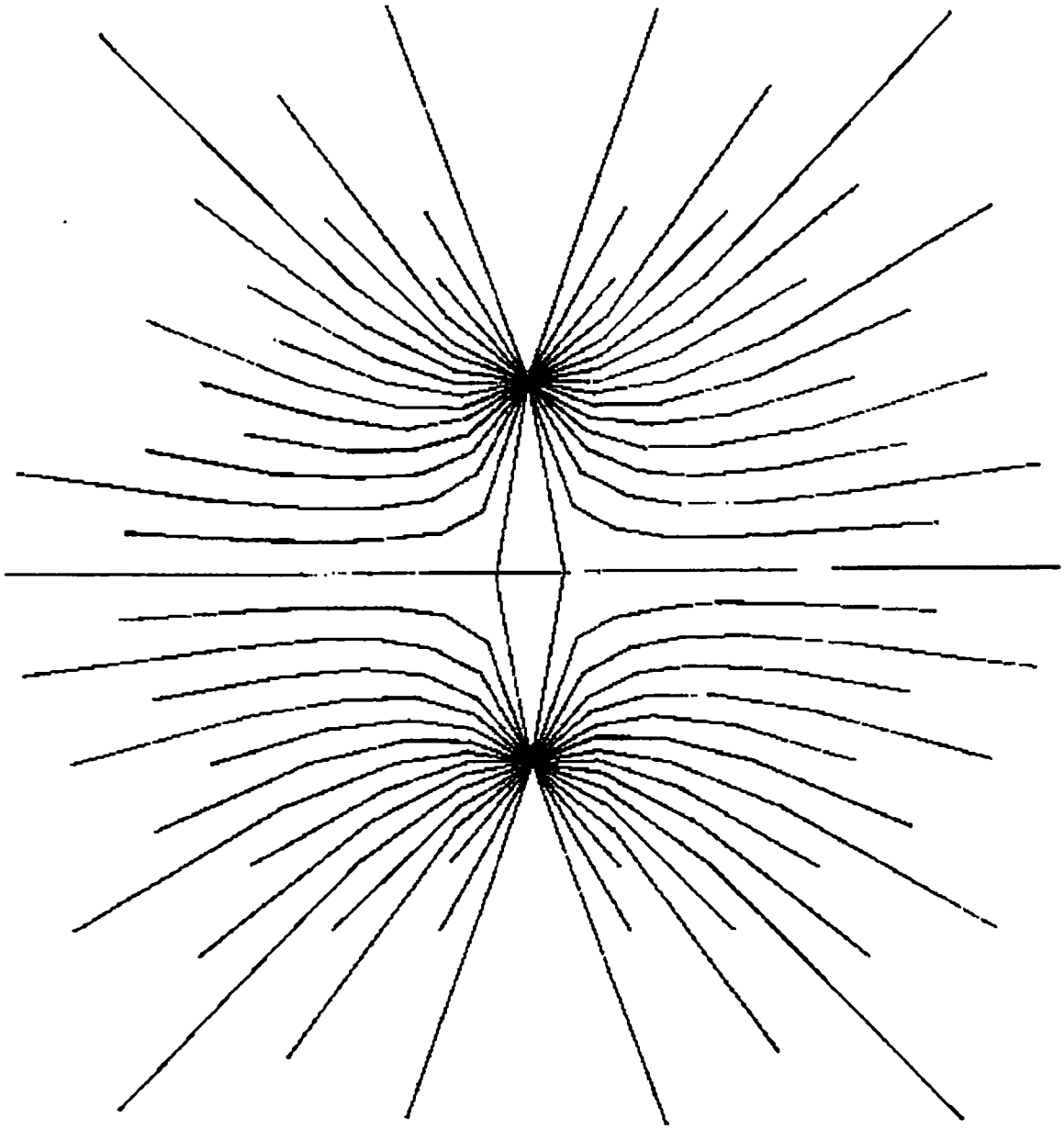

Diagram 6)

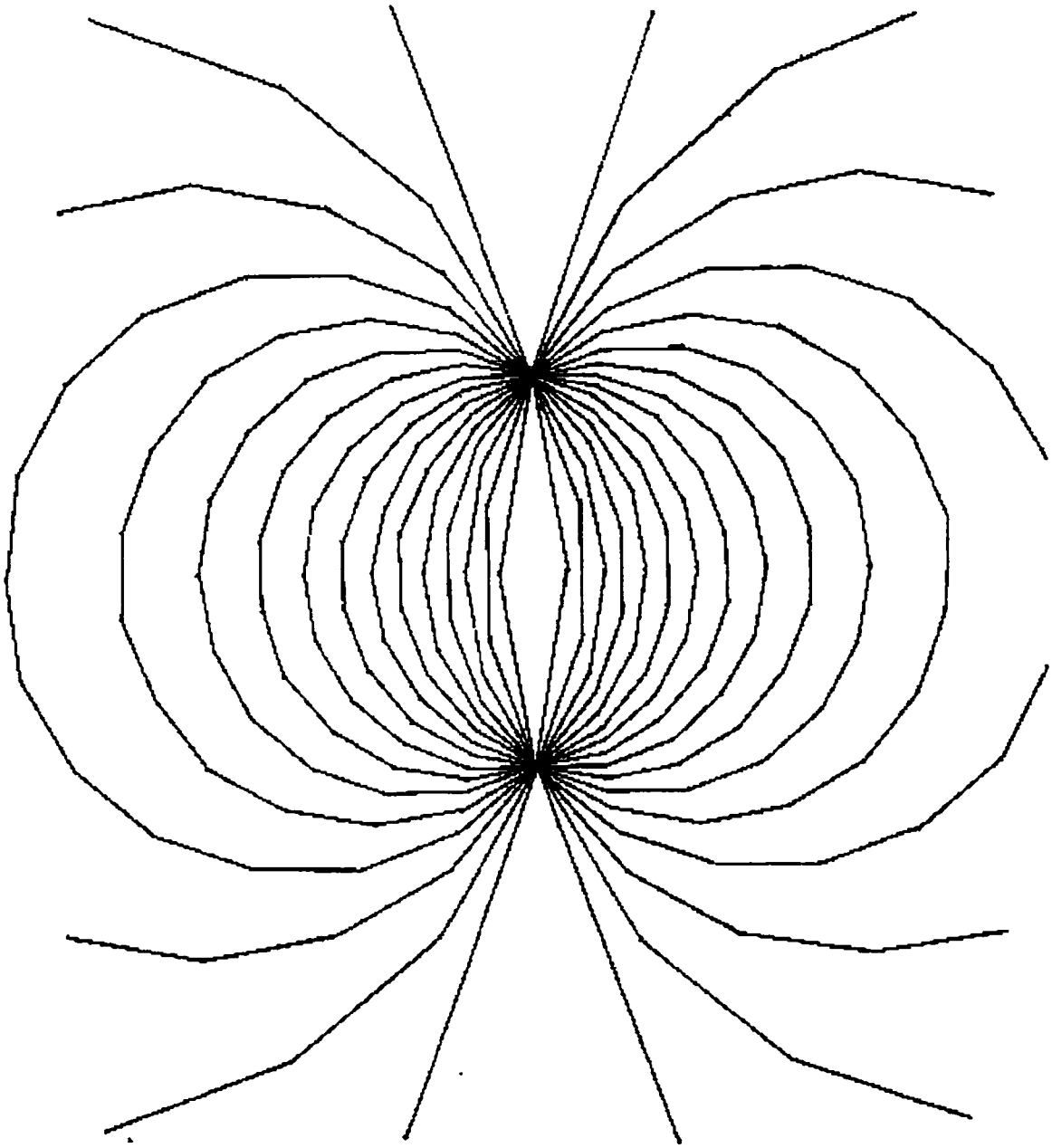

Diagram 7)

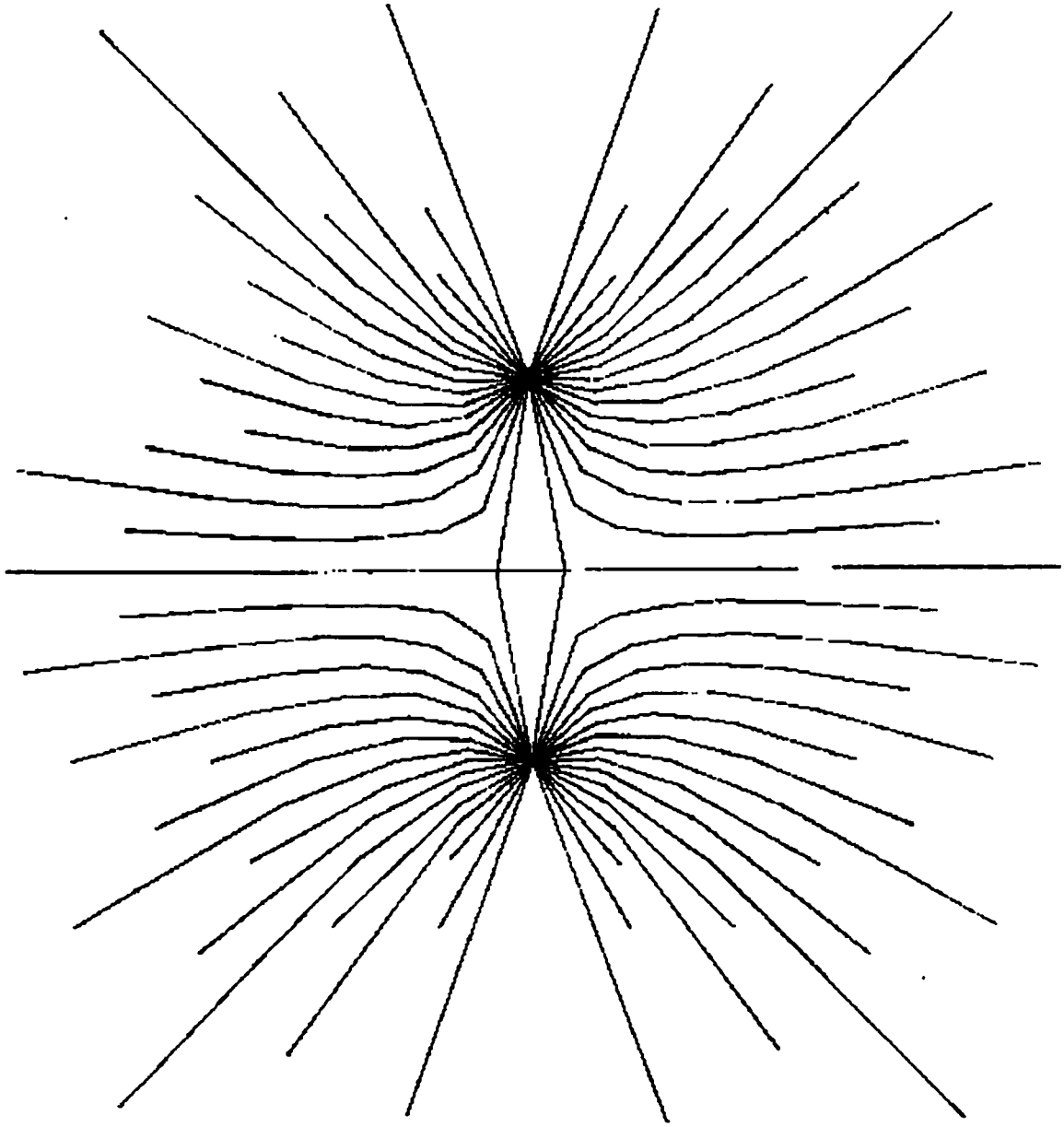

Diagram 8)

For Diagram 9, see page 54.